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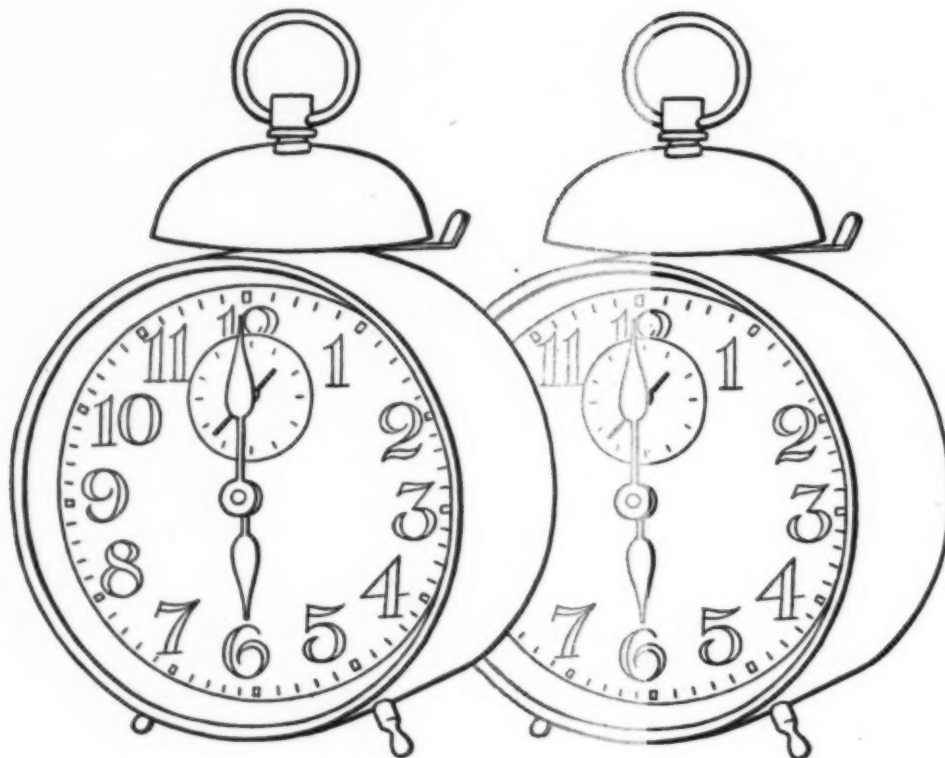
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AGRICULTURAL CHEMICALS



A Monthly Magazine For the Trade

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THIS MONTH'S COVER

Use of chemicals in controlling weeds in corn and other crops is expected soon to pass the experimental stage. Here is an example of chemically-treated uncultivated corn (right) compared to check rows on left. Article on chemical control of crabgrass appears in this issue. See page 25. (Photo courtesy New Jersey Agricultural Experiment Station, New Brunswick, N.J.)

NOVEMBER 1948
VOL. III No. 11

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AGRICULTURAL CHEMICALS

Subscription Rates: One year \$3.00, two years \$5.00. Outside U. S. one year, \$4.00. Published monthly on the 15th by Industry Publications, Inc. Office of Publication, 123 Market Place, Baltimore 2, Md. Advertising and editorial office, 254 W. 31st St., New York, 1, N. Y. Advertising rates made known on application. Closing date for copy—25th of the month previous to date of issue.

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Store 2,4-D carefully... Open containers, spilled 2,4-D and contaminated handling equipment can injure or kill plants and seeds which are stored nearby. Keep containers tightly closed.

Do not use 2,4-D handling equipment for any other purpose... Scoops, sprayers, sprinklers and other equipment can retain harmful traces of 2,4-D even after thorough washing.

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2,4-D formulators are urged to contract for their 1949 requirements at once, to assure themselves of adequate supplies. Monsanto 2,4-D is produced in three forms: 2,4-D Acid, 2,4-D Sodium Salt and 2,4-D Isopropyl Ester.

LITERATURE AVAILABLE

Monsanto Technical Bulletin O-50, "2,4-D for Weed Control," offers technical data and suggested formulations. A new 36-page illustrated booklet, "The Killers in the Field," covers the story of weed control in an interesting, informal manner. For your copies, write or ask for them on the coupon.



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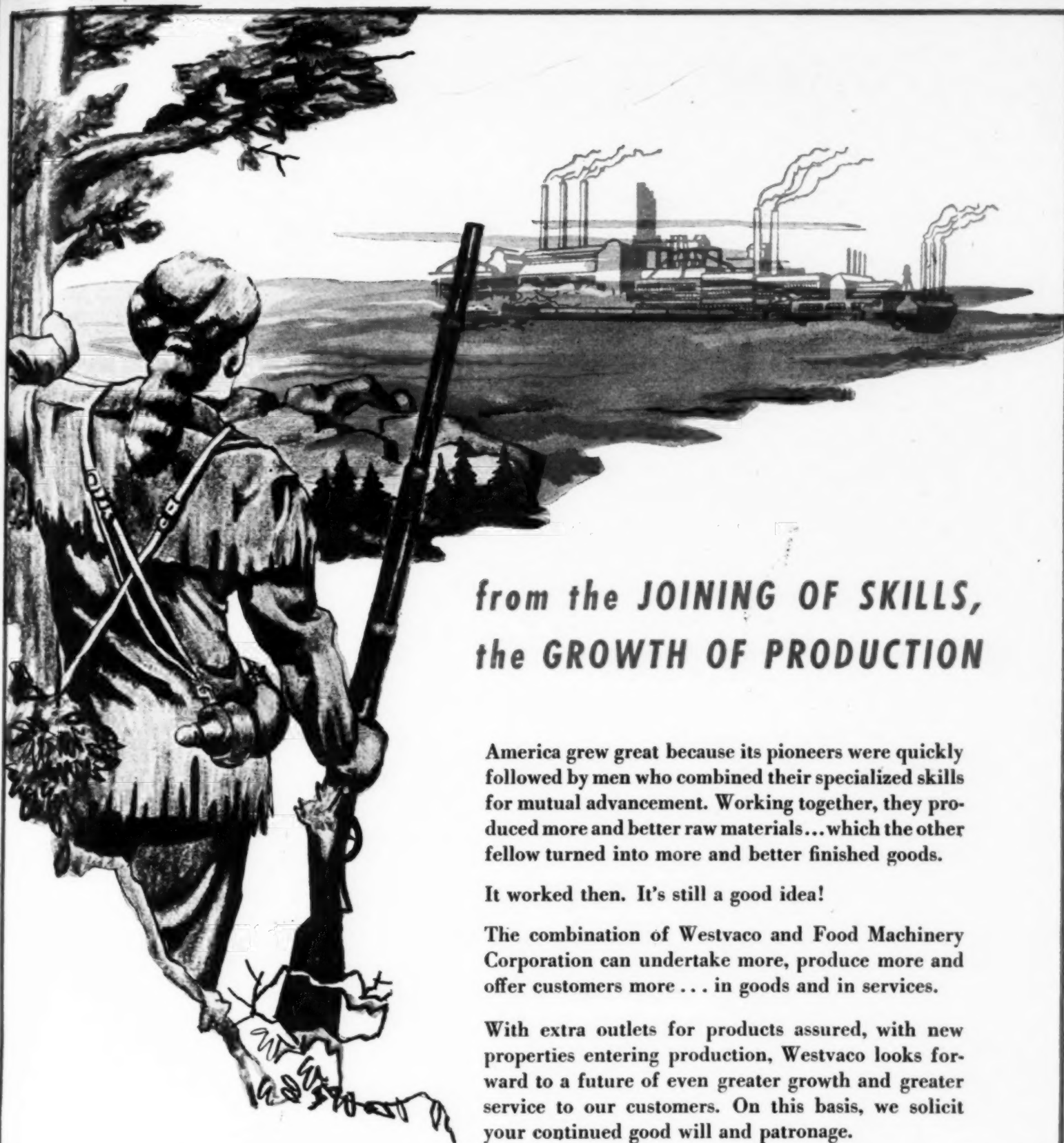
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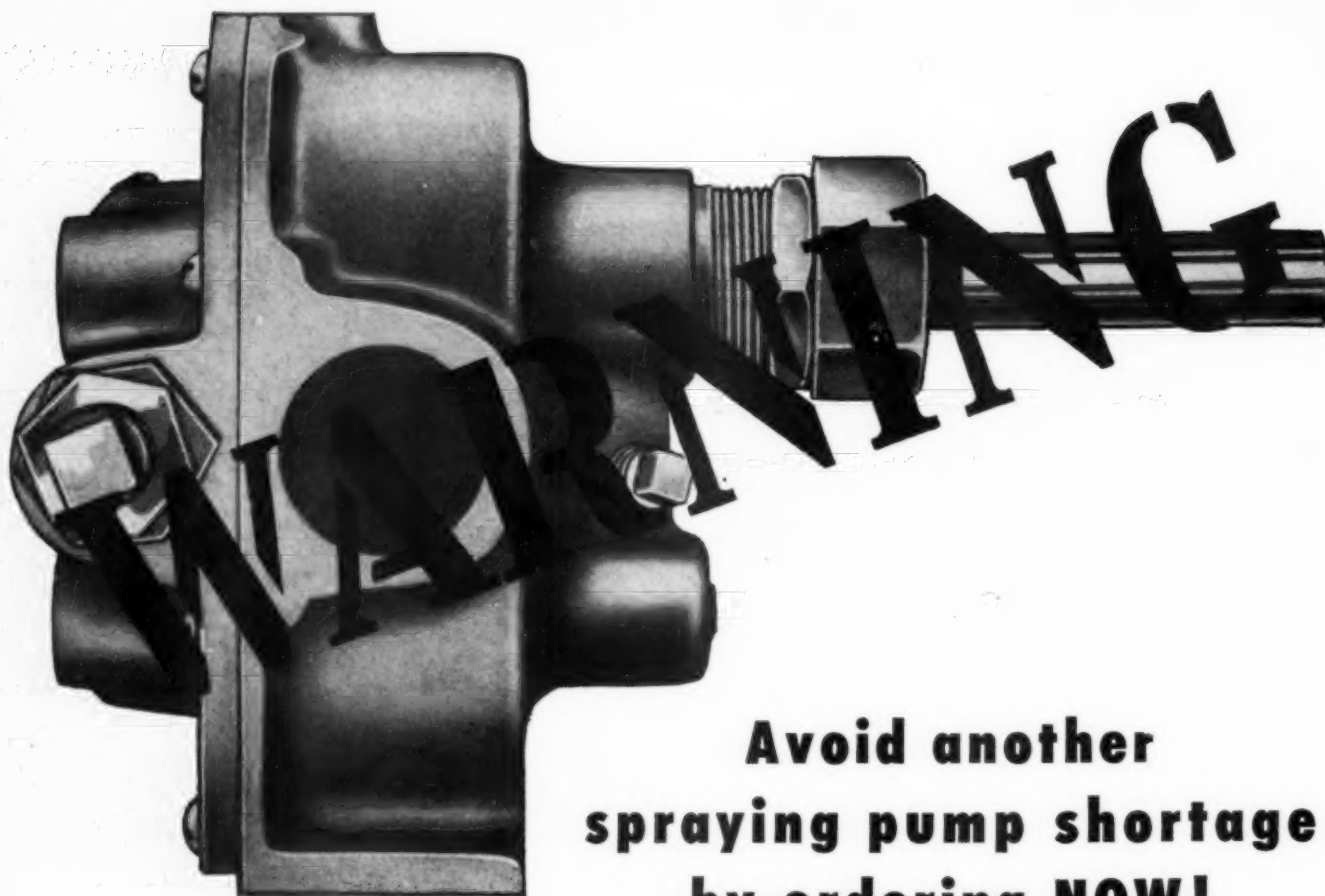


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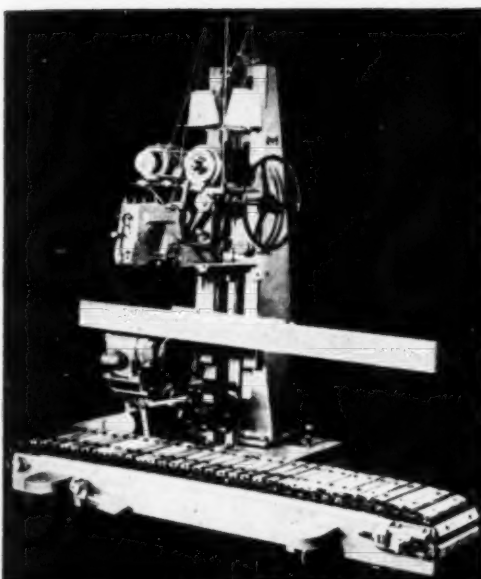
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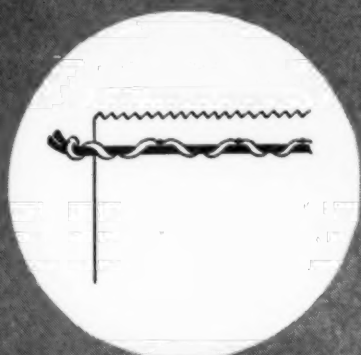
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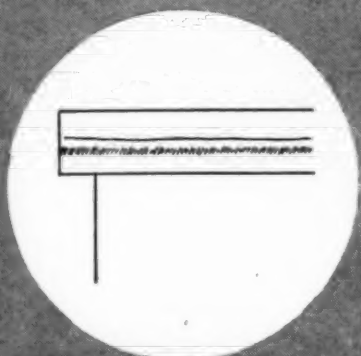
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Taped closure is effected on Model "DA"

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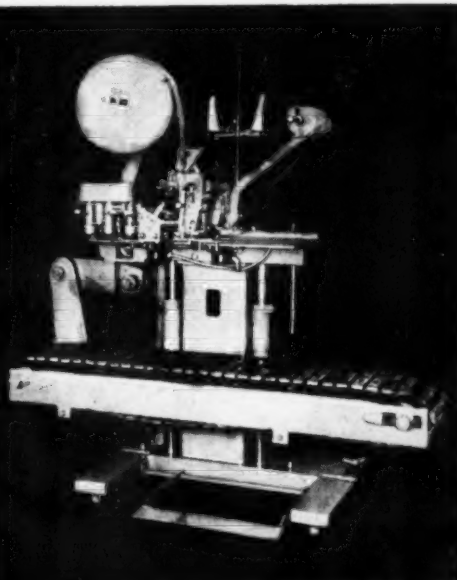
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THE EDITOR COMMENTS

THE confusion of names initials, numbers and combinations thereof which characterize the present nomenclature of insecticides, fungicides and weed killers, seems to defy all attempts to revamp the tangle into an orderly system of common names. Despite notable efforts on the part of the U.S.D.A. Bureau of Entomology and Plant Quarantine, the problem remains almost as far from solution as when the task was first undertaken a couple of years ago.

Progress was made in coining the word "chlor-dane" for a common name, and also in arriving at "parathion" as another. But the road traveled by nomenclature committees since then has been featured by a series of stop signs. Chemical prefixes and suffixes with definite meanings had to be avoided. Words ending in *ate*, *ide*, *ite*, or *ous* were vetoed by chemists who said that use of such words would add to confusion in laboratory and manufacturing plant. Nearly every time an entomologist would think up a word which seemed to fit a certain insecticide, the chemist would counter with good reasons why such a word should *not* be employed.

In view of the size and complexity of the problem . . . and the fact that new chemicals coming onto the market tend to heighten the stalemate, we certainly have no criticism of what has been done by the committees thus far. It would appear, however, that to arrive at a solution acceptable to the many groups involved, it is a job for a combined committee on nomenclature. This should be composed of entomologists, plant pathologists and chemists, all dedicated to the single goal of eliminating the current confusion and establishing in its place some kind of a workable system of names.

Although there are some who despair at the committee's ever coming up with a series of names suitable to manufacturers, sales offices, the public, chemists, the U.S.D.A. and others who have a voice in the affair, we think that the industry will continue to back the effort being put forth, and will cooperate in finding a solu-

tion. Everyone in the chemical industry has a stake in arriving at proper nomenclature, for so long as the present confusion obtains, so will misuse and errors, some of which are bound to be serious. And the more of these there are, the harder it is for the chemical industry to sell farmers on the benefits of employing agricultural chemicals.

POTENTIALITIES in the field of herbicides fairly stagger the imagination of layman and scientist alike. Manufacturers and distributors are keeping their collective eyes open for developments which may indicate the extent of new markets in order to determine production quotas for 1949 and subsequent seasons. The coming weed control conferences in three sections of the U. S. and similar meetings in Canada, are expected to reveal the answers to some of the problems, although the solution of all may not be known for some years.

Every manufacturer in the herbicide field, if at all possible, should undertake to attend whichever meeting is closest to him. These include the North Central Conference at Springfield, Ill., December 8, 9 and 10; the Northeastern Conference in New York, January 5, 6 and 7; and the Western Weed Control Conference at Bozeman, Montana, February 3 and 4. There are also state and local meetings which likewise can be of great value to the manufacturer and distributor.

Chemical herbicides have been regarded by many observers as being able to surpass the dollar volume of all other agricultural chemicals. This of course will be proved only over a period of years, but nevertheless, the development of 2,4-D and other herbicides requires sound planning and the establishment of far-reaching policies. These must keep the product under control and prevent its being considered by the public as a "miracle" preparation which will kill all weeds under all

conditions. Such an "advance billing" for DDT helped cause much confusion and misunderstanding, something which 2,4-D manufacturers and distributors cannot afford to repeat.

ENCOURAGING moves toward a voluntary working out of problems relating to airplane application of insecticides, fungicides and weed killers are being noted here and there. The National Flying Farmers' Association, for instance, was laying plans this month for an early meeting with representatives of the U.S.D.A., Civil Aeronautics Authority, chemical manufacturers, State Experiment Stations, Land Grant Colleges, and the Agricultural Editors Association, as well as with airplane manufacturers, to discuss problems of applying various toxicants from the air.

As we have often pointed out in this column, and as numerous individuals in the industry have stated, a program of education for airplane custom operators is imperative. Although the move being made by the N.F.F.A. may not solve all the problems involved, it is at least a step toward that end. It will be interesting to follow subsequent developments.

REPORTS reaching the U. S. indicate that Italy is making strong efforts to revive its fertilizer manufacturing industry which was hard hit during the war. The Montecatini Company has built a new plant at Assisi for production of sulfuric acid and fertilizers. Total cost of the works, which are to replace plants destroyed in 1944, is estimated at 400,000,000 Lire, which at official exchange rates is approximately \$700,000. Expansion of nitrogenous fertilizer production is already under way, with ambitious goals set. By 1951, Italy hopes to produce a total of 205,000 metric tons annually, as compared to a prewar average of 83,000 tons per year. The new figure includes a surplus for export. Power for the new enterprise is to be utilized from the expanded hydroelectric resources under the European Recovery Program.

One of the great problems facing Italy, as well

as most other European countries, is to feed steadily growing populations. The production of more fertilizer materials is obviously a basic step toward that end. That this is of utmost importance, goes without saying, since practically every available square foot of tillable ground in Europe is under cultivation.

American fertilizer manufacturers will continue to view with keen interest developments in fertilizer manufacture abroad, since the more produced there, the less will be the future need for U. S. exports. A thought-provoking possibility for every American producer, and one with several disturbing angles!

CONSUMPTION of pesticides in Canada reached new heights in 1947 both in quantity of materials and in their dollar value. The Canadian Department of Trade and Commerce of the Dominion Bureau of Statistics reported recently that the value of pest control products sold in Canada during 1947 amounted to \$9,749,772 at wholesale prices. This is more than double the 1940 record of \$4,581,315, which was highest recorded up to that time, and about three times the \$3,006,381 total of 1934.

While consumption of all pesticide items has increased during recent years, one of the most significant is in the field of herbicides. The 1947 wholesale total for this commodity came to \$1,046,248, as compared to \$109,569 in 1934 and \$231,417 in 1940. Reliable estimates are placing 1948 sales far above those of last year, although we have heard no official guess as yet about what the 1948 figure is likely to be.

Not only in sales of herbicides are impressive figures tabulated. Agricultural dusts and sprays were sold in the amount of \$3,936,426; livestock treatments at \$448,979; and rodenticides at \$208,200. In addition, household and industrial insecticides and disinfectants helped to swell the total.

American pesticide authorities are watching with interest the progress made by Canada in its steadily-increasing use of modern chemical methods in agriculture and look forward to its continuance. Today, we feel, is only the beginning of this progress in Canada as in the United States.

Guest Editorial written especially for
this issue of Agricultural Chemicals.

Need for Clearing-House in Weed Control Field

by
L. W. Kephart

In charge of Weed Control, Bureau of
Plant Industry, U. S. Dept. of Agriculture



WEED control conferences in different parts of the United States and in Canada are making valuable contributions to the ultimate solution of this important phase of agricultural pest problems in their respective areas. In addition to the well-established Western, North Central and Northeastern Weed Control Conferences, a Southern group has been formed recently and numerous states have their own associations. All of which indicates a keen interest on the part of agronomists, horticulturists and chemical and machinery manufacturers in determining what method of weed control will do the best job under given conditions.

To gain the maximum value from these various sectional conferences, there appears to be need for a National Technical Committee composed of representatives from these several groups. Such a Committee could get together once or twice a year, compare notes, harmonize differences and, in the name of their respective Con-

ferences, present the combined views of all weed interests in the country on matters of wide or national concern. As matters now stand, there is no one to speak with authority for all. Reports are sectionalized, opinions are at variance, and it is difficult to obtain an accurate appraisal of the facts.

Manufacturers of herbicides would be an important group to benefit from such a service. One needs only to mention the confusion that has existed with regard to 2,4-D to emphasize the point. Some of the questions about 2,4-D have been answered, many of them by the wasteful and painful method of individual experience. Many other questions about 2,4-D are still controversial. Much still remains to be learned about 2,4-D and how it reacts on various types of plants under different conditions.

Some folks think there should be a place where Federal, State, and other weed research and control interests could center up and smooth out these and other problems that affect

(Turn to Page 66B)



by

Dr. William B. Parker

California Spray-Chemical Corp.
Richmond, Calif.

THE "Vapo-Dust" (Fog Spray) method of insecticide application was originally developed for control of the Grape Leaf Hopper in the San Joaquin Valley of California. Numerous improvements have been made in the machine since the first model was built some 17 years ago, and these developments have made it possible to use the "Vapo-Dust" method for applying concentrated liquid materials to orchards, truck crops and to shade trees.

Adaptations have been developed in the eastern part of the United States to treat forest trees for control of insect parasites.

Many of these machines were designed by the research department of the California Spray-Chemical Corporation for the application of insecticides and fungicides by the "Vapo-Dust" method. Each successive model was a distinct improvement over its predecessor, as seen in the photographs.*

Use of airplanes for the application of liquid insecticides, fungicides and weed killers has been made more practical through the employment of this method of concentrated sprays.

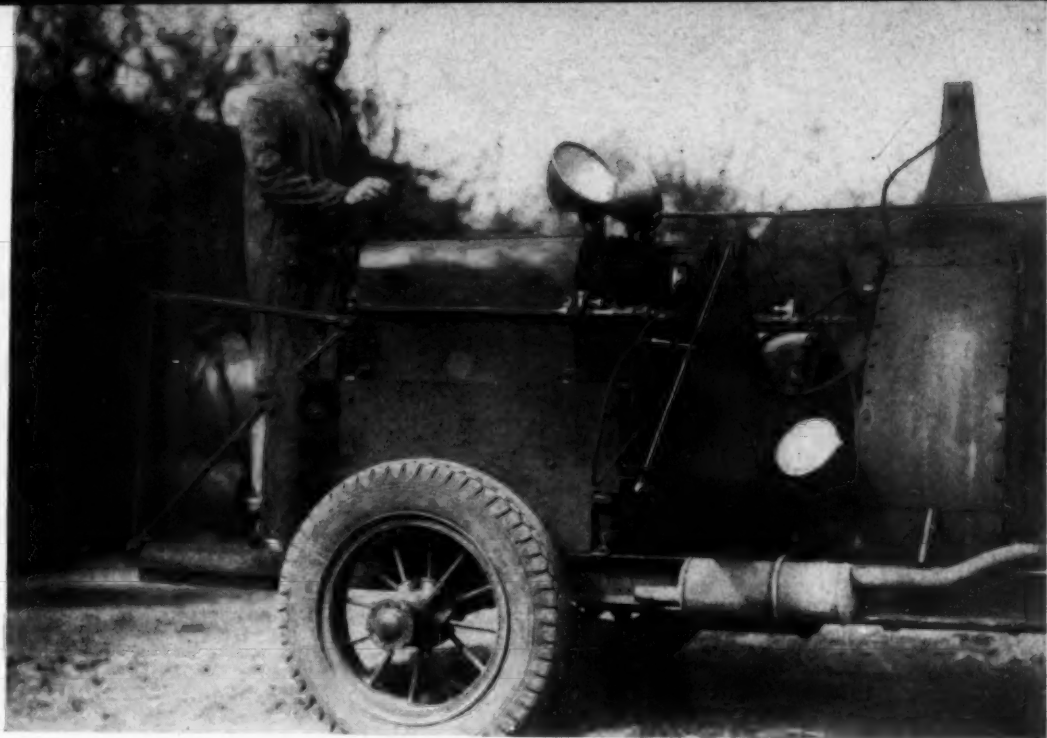
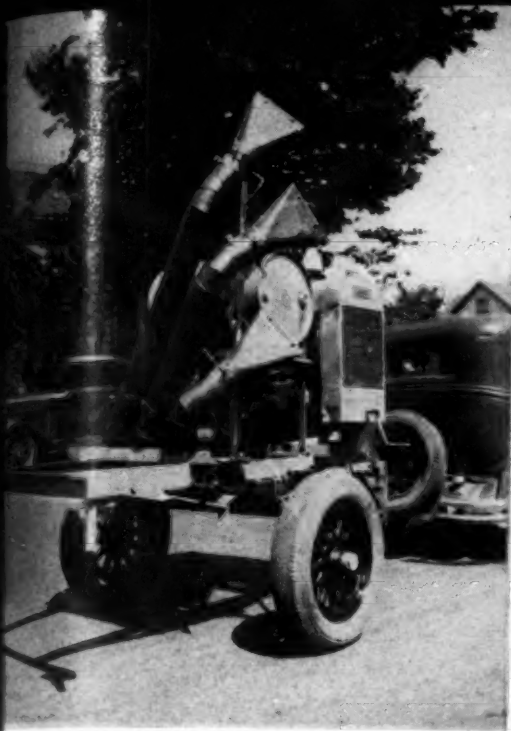
* The photographs shown here were furnished by Dr. Parker and California Spray-Chemical Corp., Richmond, Calif.

Photos: (top) First "Vapo-Duster," Fresno, Calif., March, 1931. It was made of Bean Sulfur Duster, a Bean hand pump and Monarch oil burner nozzles in the ends of the air tubes.

(Second from top) Six months later, September, 1931, an improved model using high velocity air (2½ lbs. pressure) and venturi-atomizing nozzle, at Walnut Creek, Calif.

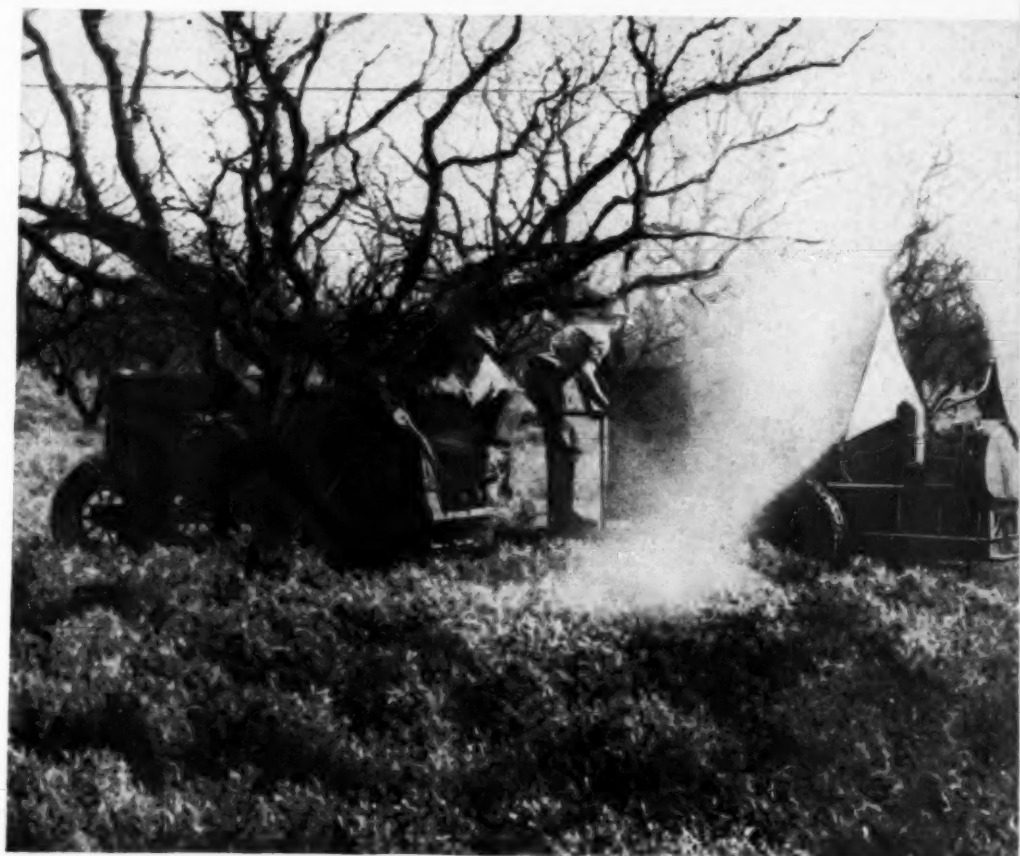
(Third from top) Group of U.S.D.A. men at Los Banos, Calif., late in 1931, working on control of Beet Leaf Hoppers on weeds in fields. High velocity air was used to atomize pyrethrum oil through venturi nozzles under a hood.

The lower photo was made a year later, showing an Ortho "Vapo-Duster" constructed from four small Bean blowers and Parker "Vapo-Dust" nozzles. The machine is treating grapes for Grape Leaf Hoppers, near Fresno, Calif.

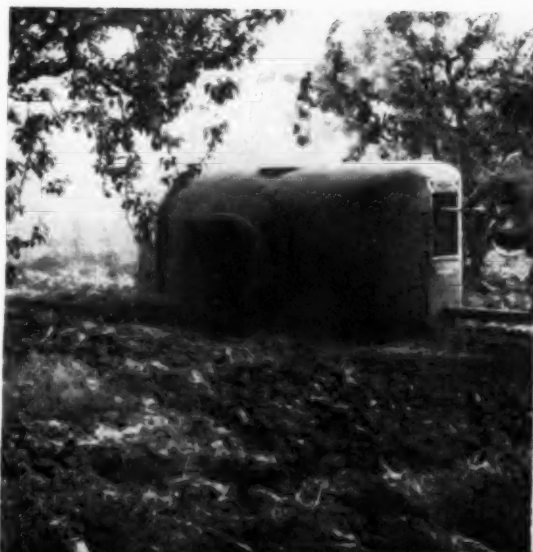


Further improvements in mechanical efficiency are noted (above) on this 1933 model "Vapo-Duster," designed to apply winter "Vaporol" at 10 gallons per acre to dormant trees. The Parker nozzle is designed to provide large orifices for the liquid. The particle sizes of the fog can be regulated. Photo taken at San Jose, Calif. in 1933. (Above, right) Custom made double Bean mist duster, designed to apply "Vapo-Dust" to trees for control of brown apricot scale; red mite eggs, thrips, leaf rollers, canker-worms, shot hole fungus, brown rot and other pests. The machine develops 9,000 cu. ft. of air at 120 miles per hour in each blower and applies from five to thirty gallons of "Vaporol" as fog spray per acre. The machine has sprayed at the rate of eight acres per hour. Dr. Parker is operating the controls.

The center photo shows the double Bean mist duster applying winter "Vaporol" and zinc "Coposil" to apricot trees for brown apricot scale and brown rot.



The lower photos, (L) "Ortho" lead arsenate and "Vapotone" being applied to pear trees as concentrated spray at rate of 50 gallons per acre with "Naconizer." Scene at Placerville, Calif., 1946. (R) "Naconizer" developing 40,000 cu. ft. of air per minute at 100 mph, using from 5 to 30 gallons per acre of concentrated spray, using 50 to 150 gallons of water mixture per acre. Suisun, Calif., 1946.





Left: Airplane applying 10 gallons of winter "Vaporol," 15 pounds of zinc "Cuposil" and 10 pounds of "Ortho" lead arsenate per acre of peaches against shot hole, leaf curl and peach twig borer. Photo taken at Modesto, Calif., in 1936.



Center (left): "Ortho" compressed air "Vapo-Duster" designed for use on truck crops. It consisted of a Ford compressor and two cylinder engine; developed 60 cu. ft. of air per minute at from 5 to 25 pounds pressure. It had a tank with agitator and gear pump. It was the predecessor of the old model row crop "Naconizer."

Center, (right) The Tuft "Destroyer," designed to apply "Vapo-Dust" or concentrated sprays to grapes or hops.



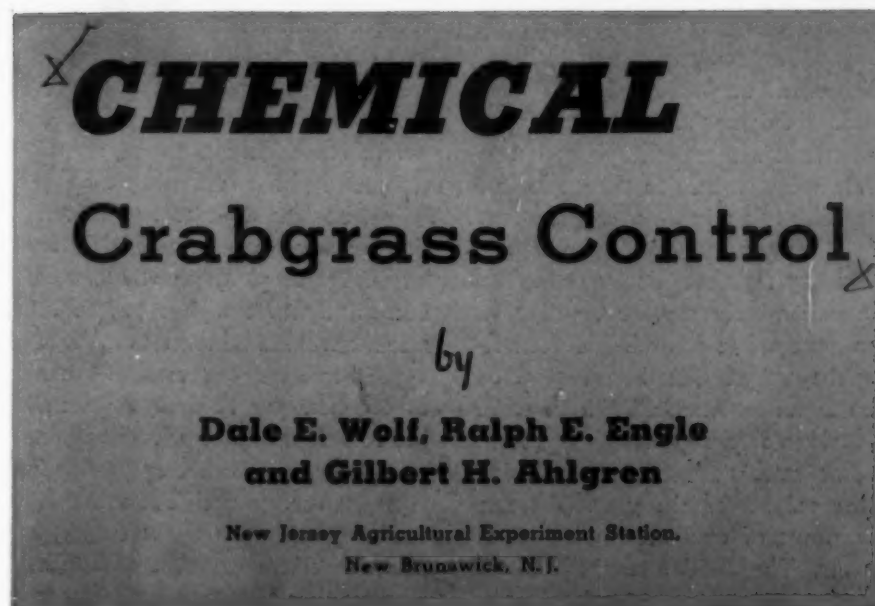
Bottom: the modern double Bean mist blower, which represents a culmination of some 17 years of experimentation and study in application methods.

DESPITE years of chemical research to find satisfactory means to control crabgrass, this pest (*Digitaria* sp.) continues to be one of the most prominent and tenacious of the common annual weeds. It is a serious pest in a number of agricultural crops, particularly in such crops as corn and potatoes. In the season just past, conditions favored crabgrass infestation, probably because of the heavy rainfall early in the season, which made cultivation impossible during part of the crabgrass germination period, and also favored the weed's growth.

The weed, familiar to growers in all parts of the United States, is a low-growing, light green plant with rather short, broad leaves in the early stages of growth. It may be either hairy or hairless, depending upon the species. As the stems develop, they creep along the surface of the soil, rooting at the joints and eventually producing upright seed stalks at the end of each stem. The seed stalks are divided into three to six fingerlike branches and both stems and seed stalks become reddish-purple in color by the end of summer.

In turfed areas and in flower and vegetable gardens, it crowds out other plants; and in turf, it causes bare brown areas in early fall when it dies at the first frost.

Crabgrass is often described as the weed most common and destructive in potatoes. Regular cultivation



affords early season control, but later when cultivation is impossible, crabgrass often takes over the plot. It interferes with the harvesting and reduces the yield of tubers. Because of the heavy top growth and thick sod produced by crabgrass, some of the tubers may be hidden from the view of pickers and according to J. C. Campbell, potato specialist at the New Jersey Agricultural Experiment Station, this results in 5 per cent or more of the tubers being left on the field. In corn and vegetables, crab-

grass competes with the plants for nutrients and soil moisture as it does with many other cultivated crops.

The chemical control of crabgrass has long been a perplexing problem to the agricultural scientist. All of the turf publications before 1930 indicated that the only successful control of crabgrass was good management and hand weeding. It was in the early thirties that research began on the chemical control of crabgrass and this research was directed particularly at controlling the pest in turf areas. Some of the early experiments conducted by F. A. Welton and J. C. Carroll at the Ohio Agricultural Experiment Station during the period 1930-1936 resulted in the discovery

Below: How treated area compares with untreated crabgrass plot. The center has been treated with phenyl mercury compound.



that the arsenates were particularly effective as crabgrass killers. Lead, calcium and magnesium arsenate were tested and it was concluded that lead arsenate is a more efficient crabgrass killer and less toxic to the grass than the other two arsenates. Applications of 25 pounds of lead arsenate per 1000 square feet during October, December, February, or April gave nearly complete control. Besides killing the crabgrass, lead arsenate acted also as an insecticide. This material is toxic to all the grasses if applied at higher rates and if applied during other seasons of the year. Extreme care must of course be exercised in its use. The variable results obtained from use of this chemical, plus its toxicity, tend greatly to discourage its use.

About the same time as these experiments were being conducted, the Greens Section of the U. S. Golf Association was conducting investigations on the use of sodium chlorate for crabgrass control. It was found that good control of crabgrass could be obtained by using 3 applications of this material. Time of treatment was found to be of importance and it was suggested that the first application be made when the seedling plants are in the two-leaf stage. Additional applications at monthly intervals were found to give best results. The maximum rate suggested for the first treatment was one pound to 1000 square feet and two pounds to 1000 square feet for each of the succeeding applications. Temporary discoloration of the turf followed each treatment, but the turf grasses recovered while the crabgrass did not. Sodium chlorate is not considered toxic, but its use creates a fire hazard. By itself, it is not inflammable, but other combustible material that becomes saturated with a sodium chlorate solution will easily ignite from friction when dry. The discoloration to the turf grasses and danger of fire in the use of sodium chlorate have reduced it to a status of little value as a selective crabgrass killer.

Sodium arsenite has been most widely used for destroying crabgrass in the past. Successful use of this chemical for the selective control of

crabgrass in turf was first reported in 1935. It was found that August treatments with sodium arsenite would eradicate the crabgrass plant and would cause only a temporary discoloration of the turf grasses.

Sodium arsenite is a material that requires considerable skill and knowledge of plant growth to use it successfully. At high rates, sodium arsenite will kill all vegetation. When applied as a spray at rates of from 1 to 4 ounces per 1000 square feet, it has been found to be effective against crabgrass without causing permanent injury to turf grasses. The actual rate used depends upon the soil moisture and temperature at time of application together with the stage of growth and height of the plants. As with the arsenates, the accumulation of sodium arsenite in the soil causes a detrimental effect on certain harmful turf insects that inhabit the soil.

The greatest increase in the use of sodium arsenite on turf has been noted throughout the South for control of Bermuda grass which is more highly resistant to caustic action by chemicals than other grasses. Sodium arsenite has been used successfully in eradicating crabgrass from this type of turf.

Sodium arsenite has also been used very successfully in the eradication of crabgrass from potato fields. Here it is used not only as a crabgrass killer but also as a potato vine killer. In potato fields, it is desirable to reduce the amount of top growth and also to cause the crabgrass roots to break down so that the thick sod will not cover the tubers when they are dug. The rate of application most commonly used in potatoes is 5 pounds of sodium arsenite per acre.

To sum it up, it appears that two characteristics limit the use of the arsenicals as selective weed killers, their toxic properties and their burning effect on turf grasses.

Use of 2,4-D

SELECTIVE control of crabgrass in field crops with 2,4-D was first reported by Anderson and Wolf at the New Jersey Agricultural Experiment Station in 1946. It was discovered that 2,4-D used as a pre-emergence treatment in corn would

control crabgrass and other annual weeds effectively without injuring the corn. Applications of 2,4-D on the soil five days after planting completely prevented the growth of crabgrass for a period of six weeks after application. Experiments on the pre-emergence control of weeds in corn with 2,4-D have since been conducted in nearly all parts of North America, and in general, it is agreed that from 1-1.5 pounds of 2,4-D acid equivalent applied 5-8 days after the soil has been prepared will control effectively annual grasses such as crabgrass. The primary advantage of this method is that annual grasses can be controlled by a pre-emergence treatment with 2,4-D although they are uninjured if 2,4-D is applied after emergence.

Pre-emergence control of weeds with 2,4-D has also shown promise in tests on potatoes. In New Jersey experiments this past summer, early growth of crabgrass was eliminated from the potato plots without cultivation. However, crabgrass began to appear in the plots 5 weeks after treatment. More research is needed on the use of 2,4-D as a pre-emergence treatment for the control of crabgrass in potatoes before any recommendations can be made.

Calcium cyanamid used as a pre-emergence treatment on corn has controlled crabgrass for from 3-4 weeks under certain conditions. Wolf and Ahlgren at the New Jersey Agricultural Experiment Station reported in 1948 that 300 pounds of granular cyanamid per acre applied immediately after the corn was planted resulted in excellent control of crabgrass and other annuals with no injury to the corn. This method of treatment has been tested quite extensively during the past growing season and more data should be available after yields are obtained.

New Turf Chemicals

SEVERAL new organic herbicides are now on the market for the control of crabgrass in turf areas. Nearly all of these are made up of water-soluble mercurials. The effectiveness of this group of compounds was first reported by Dr. J. A. DeFrance of the Rhode Island Agricultural Experiment Station in 1946.

The mercurials were being tested for their fungicidal properties when it was noted that plots treated with these chemicals were comparatively free of crabgrass at the end of the season. In this series of tests, applications were made every 10 days from June to September.

After this preliminary report on the selectivity of the water-soluble mercurials for the control of crabgrass, further tests were conducted by other experiment stations and several commercial companies. During the summer of 1948 a rather extensive series of tests on the control of crabgrass in turf was conducted at the New Jersey Agricultural Experiment Station under the direction of R. E. Engel, turf specialist. Although the results from these tests have not been summarized, it is evident that satisfactory control of crabgrass in turf can be obtained under New Jersey conditions using the phenyl mercury compounds.

If care is taken in the use of the phenyl mercuries, excellent crabgrass control can be obtained without serious discoloration to the turf grasses. Discoloration is very important to the lawn owner and the greenkeeper. In this respect, the mercury compounds have a definite advantage over those chemicals previously used to kill crabgrass in turf.

Although the mercurial formulations are the most effective selective crabgrass killers commercially available today, they still leave much to be desired. Two to five applications of the phenyl mercury compounds are required to obtain complete control of crabgrass in turf, a definite disadvantage. Mercury compounds are not used for field crops or extensive turf areas because of the relative high cost of material. Their use is therefore, limited to lawns and other small turf areas. The mercurials are also poisonous to man and animals and severe irritation will result if the concentrated compounds touch the skin.

Despite their disadvantages, the phenyl mercury compounds have been used quite widely as crabgrass killers in the Northeastern section of the United States during the past two summers and perhaps will be used

even more widely in 1949. They are safer and more effective than the chlorates or arsenicals.

Dr. A. M. S. Pridham of Cornell University, reported the use of 2,4-D as a means of controlling crabgrass in turf in 1946. Five pounds of 2,4-D per acre, applied at the time the crabgrass seedlings first appeared, gave some degree of control. Pridham indicated that repeated spraying at short time intervals offered a possible control of annuals such as crabgrass which continue to germinate throughout the growing season. The possibilities of this method have not been fully investigated.

Oil Treatments

THE use of oil formulations as a selective treatment for the control of crabgrass in turf areas was reported in 1948 by Dr. B. H. Grigsby of Michigan State College. His work indicated that two materials, "L-2687" and "L-2998," produced by Standard Oil Company of Indiana, showed considerable promise as selective crabgrass killers. Research was conducted at several experiment stations on these materials this past summer and more results will be available later this fall.

Preliminary results of experiments on the control of crabgrass in turf conducted by Engel and associates at the New Jersey Agricultural Experiment Station in 1948 indicate that several new chemicals tested have definite promise of being superior to the phenyl mercury compounds. In these experiments about 35 materials were tested at four different dates during the growing season. Applications were made in June, July, August and September and each treatment was replicated three times. Two of the new chemicals which show considerable promise as selective crabgrass killers were supplied by the Sowa Chemical Company of New York City. These two compounds were designated as "S-1980" and "S-1998" in the experiments. One application of either material, especially in the July treatment, resulted in selective control of crabgrass with only a slight discoloration to the turf grasses. Besides showing selectivity, these two materials have the definite

advantage of being non-poisonous; they are not irritating to the skin nor are they inflammable.

One of the other materials tested which looks promising as a selective crabgrass killer is a formulation of potassium cyanate* (designated as "W" in the tests). This compound, when applied as a 1% solution and at a volume of 10 gal. of solution per 1000 square feet, gave excellent control of crabgrass with very little discoloration to the bluegrass. Bent grass and the fescues were discolored but recovered within a period of 10 days after treatment. This material has the same advantages as do "S-1980" and "S-1998" in that it possesses similar characteristics from a practical standpoint and it is comparatively inexpensive.

More extensive research is needed on all of these new crabgrass killers and it will probably be several seasons before they are commercially available. They do have a number of advantages over the arsenicals, chlorates and mercuries. If further research bears out preliminary observations, there is likely to be little delay in their adoption for the control of crabgrass in turf.

The future for chemical control of crabgrass appears much brighter today than in previous years. The discovery of selective crabgrass killers indicates that there are tremendous possibilities for the future. The need for extensive research on the use of wetting agents and stickers with the various possible herbicides is becoming of utmost importance. Much work needs to be done to determine the most desirable time of application, volume rate, and cultural practice to be used with each new compound. The effect on the broad-leaved weeds and clover is also extremely important in the final evaluation of the crabgrass killer for turf.

The use of chemicals for the selective control of crabgrass in field crops has been neglected. With the exception of 2,4-D and cyanamid as pre-emergence treatments in certain

*Potassium cyanate itself is sold under the trade name of "Aero Cyanate" by American Cyanamid Co., New York. Used commercially as selective weed killer in onions.

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Plant Disease Forecasting Makes
Possible More Effective Methods of

Fungicidal Control

by

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ONE of the most essential factors in practical plant disease control is knowing when control is likely to be needed. This is especially true of diseases that fluctuate widely in severity and distribution from one year to another, for which control materials are not profitable to maintain as routine practice every year, but which must be used promptly and constantly to do any good when necessary. If the disease should attack suddenly before the grower is able to get the materials necessary to protect his plants, control is more difficult and less effective than when it is applied before the original infection takes place. The 1946 tomato late blight epidemic reported in *Agricultural Chemicals* for June 1947 is an excellent, although extreme, illustration of the loss that can result when a disease attacks without notice.

The Crop Plant Disease Forecasting Project of the Plant Disease Survey was established to help growers know in advance when they will need to apply control measures. The project has two parts, namely, a current warning service, and research into the factors affecting plant disease forecasting.

In *Agricultural Chemicals* for December 1947, the writers described

the preliminary warning service set up last year to collect and distribute prompt information on the development of tomato late blight during the season. This year, under the new project, the service was extended to include tobacco blue mold and downy mildew on cucurbit crops (cucumbers, squash, and melons), besides late blight on both tomato and potato. It operates in the same way as before, i. e., current information on the progress of the disease in each cooperating State or Canadian Province being reported promptly by plant pathologists to the Plant Disease Survey. The Survey compiles these reports into a warning letter sent to all these key pathologists. From the reports on occurrence and severity in localities with an earlier season, together with their own knowledge of the behavior of these diseases under local conditions, the key pathologists obtain a fairly accurate idea about how soon and how seriously crops in their own region are likely to be affected. Thus they can warn growers in advance to be ready to protect their crops. By arrangement with the Agricultural Insecticide and Fungicide Association, the fungicide industry also receives the warning letters, to let dealers know where specific fungicides are likely to be needed.

Present knowledge about the way in which these diseases act is only enough to allow pathologists to determine probabilities under given conditions for a short time ahead. Both the disease and the factors affecting its activity must be carefully watched, so that the forecast can be changed if any thing should happen to alter the likely course of events.

It is not possible to say definitely what will happen very far in advance or over a wide territory. The inclusion in the Forecasting Project of the investigations on all the factors influencing the spread of these diseases is a beginning at obtaining the basic knowledge that must be available before long-time wide-range predictions can even be considered. These studies are of fundamental importance. It is hoped eventually to find out which factors are decisive at any given time and to discover some pattern that will enable their being foreseen as far in advance of their actual operation as possible. In the meantime, even the short-time warnings will be on a much surer basis as experience and knowledge accumulate.

This research part of the forecasting project is carried out by plant pathologists stationed by the Survey at Experiment Stations in three regions, namely, at Ames, Iowa in

the north-central, at Newark, Delaware in the northeastern, and at Raleigh, North Carolina in the southeastern region. Figure 3 shows the States composing each region, as well as the subjects that are the main topics of research in each. (At present neither the warning service nor the research work has been extended west of the Plains States because Western conditions and requirements are very different and there has been no experience on which to base profitable forecasting in the West.) The Survey is responsible for the main plan of investigation and for fitting the regional research programs into it. All of the experiment stations in a region are consulted in setting up the study programs; their experience of local conditions and knowledge of local problems are essential in developing effective procedure.

At present, study at the various Stations is concentrated especially on late blight, particularly on the relation of disease development to specific weather conditions and on the means by which the organism spreads. The other diseases are caused by fungi related to and acting

in somewhat the same manner as the late blight organism, and much of what is learned about late blight will be applicable to them.

As already said, this study is aimed at obtaining knowledge by which it will become possible to foresee early what a disease will do during any given season, so that growers can be notified in advance whether or not they need to prepare for its attack. In the case of widely fluctuating diseases such advance information is obviously of prime importance in reducing risks to the grower. However, fungicide manufacturers and dealers can recognize its advantages to themselves, as well, in enabling them to anticipate seasonal and regional requirements for specific fungicides. There is a possibility, moreover, of another gain not so obvious, both to growers and fungicide dealers. Satisfactory control means are available for many diseases, but rather than undertake the expense and effort of using them and then finding that they were not needed after all, growers often take a chance. If they can be assured that there need be very little guesswork, growers probably will be

much more inclined to use control measures when need for them is indicated. In the long run, there is likely to be an increase in the use of control and greater satisfaction with its results.

Part of the function of the forecasting project is the accumulation of a background of accurate observation on disease incidence, damage, and control, during each season. Readers of *Agricultural Chemicals* are most interested, of course, in how the fungicides are used, to what extent, and with what results. The tables list the information on that subject acquired this year.

The accompanying maps show where late blight occurred on both tomatoes and potatoes and where it was most important in 1948. Tables and maps may assist fungicide manufacturers and distributors in planning future allocation of these control chemicals.

This warning service constitutes a good example of close cooperation between agricultural science and industry, working together to give the farmer accurate information on the use of fungicides.

TABLE I
Control of late blight on tomato: Materials used and effectiveness in 1948

State or Province	Material and Formula	Percent growers using	Percent applied by		Results and Remarks
			Ground machine	Airplane	
Delaware	Fixed Copper dust (Tribasic; Copper A), 5-7% Cu.	80	10	70	Fair
	"Dithane D-14" + zinc sulfate spray, 2 qts.-1-100	10	10	0	Good
	"Dithane Z-78" spray, 2-100				
	"Parzate" spray, 2-100				
Florida Indiantown	"Copper A" dust, 7% Cu	30% acreage	0	all	75% loss
	"Copper A" spray, 5-100	30% acreage	all	0	Good
	"Dithane D-14" spray, 2-1½-100	30% acreage	all	0	Good
	"Dithane D-14" spray, 2-1½-100	100% acreage	all	0	Good
Belle Glade	"Dithane D-14" spray, 2-1½-100	100% acreage	all	0	Good
Bradenton	"Dithane D-14" + zinc sulfate + lime spray, 2 qt.-1 lb.-100 gal.	75	all	0	Mostly used on seed beds. Good results from both.
	"Phygon" spray, ¼ lb.	10	all	0	
Dade County	Copper dusts and sprays	Little	—	—	Did not give commercial control
	"Dithane D-14" + zinc sulfate + lime, 2-1½-100	90	all	0	Fair to excellent depending on thoroughness

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Distribution of Late Blight of Tomatoes & Potatoes in 1948



Fig 1. DISTRIBUTION and IMPORTANCE of TOMATO LATE BLIGHT in 1948

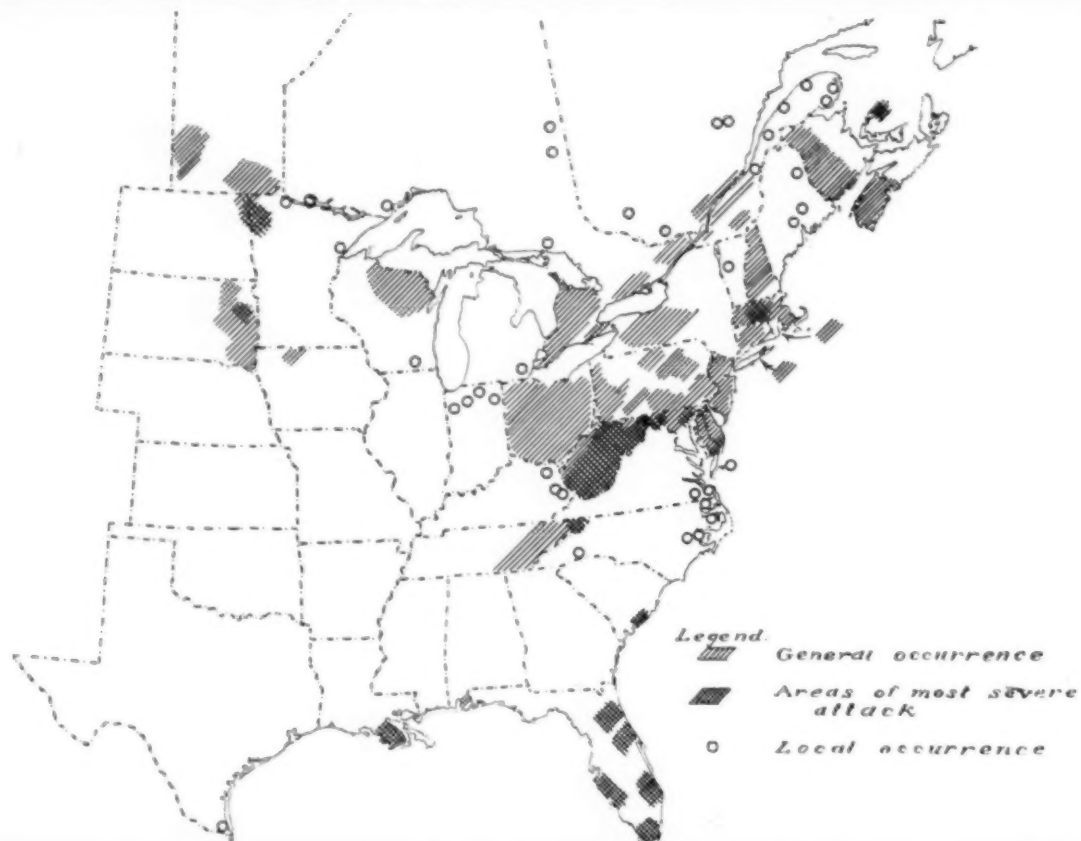


Fig 2. DISTRIBUTION and IMPORTANCE of POTATO LATE BLIGHT in 1948

Georgia						
Greenwrap area	Tribasic copper spray, 4-100 Bordeaux 2-2-50	}	50	all	0	No blight in greenwrap area except slight amount in one location
Certified tomato plant growers	Tribasic copper dust Tribasic copper spray		75 25			
Louisiana	"COCS" dust, 12%		25	all	0	Good
	"Dithane Z-78" dust, 6% + DDT		5	all	0	Good
	Bordeaux spray, 4-4-50		35	all	0	Good
Maryland (Eastern Shore)	Fixed Copper (Dust 5-7%)		70% acreage			Good
	Fixed Copper sprays (4-100)		8% acreage			Good
	Bordeaux (8-8-100)	}	2% acreage			Good
	"Dithane Z-78" (2-100)					
	"Dithane D-14" (2 qt.-1-100 (about 40% of application on lower eastern shore by air-plane, practically none elsewhere)					
North and West of Bay	Fixed Copper (Dust 5-7%)		20% acreage			Good
	Fixed Copper (Spray 4-100)		20% acreage			Fair to Good
	Bordeaux spray 8-8-100 (some ready mixed)		20% acreage			Good
Massachusetts	Neutral Copper dusts (various), 6-7% Cu		10	all	0	Good from all materials but easy to control
	Neutral Copper sprays (various)		40	all	0	
	Bordeaux spray, 4-4-50		40	all	0	
Michigan	See separate table below for Michigan data					
Mississippi	"Copper A" dust, 12-10-78		Less than 10	all	0	Obscured by weather
	"Copper A" spray, 4-96		Less than 10	all	0	
New Hampshire	Neutral copper dust, 5-7% Cu		All commercial growers	all	0	Good
New Jersey	Copper dust, 7% Cu, (ground) 14% Cu, (air)		60	50	50	Good Fair to poor
	Organic dust (various) largely "Zerlate," mostly with Copper in program also		(20) included also with Cu users	50	50	Fair for blight
	Copper spray, 4 lb./100 gal. of a 50% Cu		20	all	none	Excellent to good
	Organic sprays (see dusts)		(7)	all	none	Fair
New York (Northwestern Canning Section)	Insoluble Copper dust (COCS, Copper A, Microgel, Tennessee Tribasic), 7% Cu		2	99	2	Poor
	"Zerlate" 2-100—Bordeaux 8-4-100 spray schedule		90	all	0	Excellent
	Insoluble Copper Spray (as above), 7% Cu		10	all	0	Excellent
	Also 10% "Zerlate" along with insoluble Copper dust		40-60 lbs. of each per acre	few		
Long Island	Sprays — Bordeaux, "Dithane," or Tribasic Copper Dust—largely Tribasic Copper					Weather unfavorable to disease
North Dakota	Tribasic Copper dust		1	all	none	Fair
	Tribasic Copper or Bordeaux spray		5	all	none	Fair

(Tables Continued on Page 63)

Washington Host to Annual Meetings of **CONTROL OFFICIALS**

THE Association of Economic Poisons Control Officials elected as its president, Dr. Henry J. Hoffmann, St. Paul, Minn., at the group's second annual convention at the Shoreham Hotel, Washington, D.C., on October 9. Dr. Hoffmann succeeds Dr. J. L. St. John, Pullman, Washington, who automatically becomes an ex-officio member of the executive committee. The new vice-president is Dr. J. F. Fudge, College Station, Texas, succeeding Dr. Hoffmann. Dr. A. B. Heagy, College Park, Md., remains as secretary-treasurer.

That industry should "make haste slowly" in putting new insecticides on the market was reiterated by a number of speakers who addressed the convention. There were also repeated pleas for closer cooperation between governmental agencies and manufacturers. Dr. St. John, in his presidential address, stated that progress has been made toward solution of some of the problems which faced the association a year ago. There is no shortage of new problems, however. He pointed out the confusion regarding toxicity and antidotes, and the need for uniformity in defini-

tions as examples and cited the need for a positive approach to the solution of these problems.

Dr. St. John explained how new organic insecticides have created new problems since some are toxic not only to the insects which they are designed to control, but also in varying degrees to the persons who work with the material and to domestic animals on which the toxicants may be applied. He said that much pressure has been put on the industry by impatient growers who demand the new and potent insecticides, despite the fact that many of the materials lack histories adequate for accurate appraisal. Undue haste in the introduction of new products creates many new problems, he observed.

New officers of the Association of Economic Poisons Control Officials assembled at Washington meeting. Left to right: Dr. J. F. Fudge, College Station, Texas, vice-president; Dr. E. W. Constable, Raleigh, N. C., executive committee; Dr. A. B. Heagy, College Park, Md., secretary-treasurer; Dr. H. J. Hoffmann, St. Paul, Minn., president; Allen B. Lemmon, Sacramento, Calif., executive committee; Dr. W. G. Reed, U.S.D.A., Washington, D.C., executive committee; and Dr. J. L. St. John, retiring president and ex-officio member of executive committee.

The ideal way to handle the situation, he said, would be through voluntary control on the part of the manufacturers, but this must be followed by restrictive legislation if self-discipline fails, he warned. Putting materials on the market too soon, frequently acts as a boomerang, with disastrous results. It is the function of the control officials in each state to protect both the consumer of economic poisons and the manufacturers, he said.

Dr. H. W. Hamilton, National Association of Insecticide and Disinfectant Manufacturers, and Lea S. Hitchner of the Agricultural Insecticide and Fungicide Association were called upon for comment. Both expressed a desire for cooperation between industry and the law enforcement agencies, and emphasized the need for a common ground upon which to meet and settle any misunderstandings or differences of opinion which might develop.

James McConnon, vice-president of McConnon & Co., Winona, Minn., discussed Government-Industry Cooperation in Grower Protection. He reminded the group that





a new set of conditions obtain now in the industry; that DDT and other insecticides are regarded as "miracle" products, which create demand for materials before they are ready for the market. He said that the industry and the law-enforcement officials have a mutual problem in protection of the public. In this interest, he said, more and more research needs to be completed so that growers may be better informed, and so that more effective products may be provided. Two years of experimentation should precede marketing of a product, he said.

In way of suggestion toward better cooperation between officials and manufacturers, Mr. McConnon urged that the former confer regu-

larly with industry and be positive that regulations are soundly based on existing laws in the states in which they are adopted. He asked that the practicality of regulations be examined before they are passed, and that such regulations be of reasonable nature so that industry may be able to continue to supply agriculture.

He pointed out one instance where a single manufacturer was forced to pay out more than \$13,000 annually for registration alone, on a list of products whose sales grossed but a million a year. This, he observed, makes the proportional cost of 1.3 percent prohibitive, particularly when the margin of profit is slender in the first place. The alternatives are either to go out of the insecticide business, or to pass the added cost of registration on to the consumer. Mr. McConnon asked that serious consideration be given to the placing of control costs on all consumers, since they, in the end, are the ones who benefit from the protection thus afforded.

Describing "Western Industry's Attitude and the Reasons for it," G. F. MacLeod, president, Pacific Insecticide Institute, Fresno, Calif., brought out many parallels in the agricultural problems of eastern and

western areas of the U. S., and also named other matters which are characteristic of the west. He said that it is difficult to strike an average of attitudes held by industry of the three Pacific Coast states and Arizona, because of environmental differences. He mentioned confusion which exists on the coast, and stated that much of it originates in lack of education on use and properties of new organic insecticides. "Industry can, has, and is manufacturing new materials which are excellent," he said, but added that "there is an obvious lack of up-to-date information held by plant doctors, food growers and processors, and even the medical profession on the effect of new toxicants." He said there is great need for a unit to correlate data to counteract the controversy, ignorance and confusion which is likely to continue until this is done.

He declared that the agricultural chemical industry is no longer to be regarded as a group of charlatans, mystics and brewers of strange concoctions. It has developed to the point where there is no longer need for vigilantes to watch its actions, but rather a spirit of cooperation exists between the industry and the state control officials.

Photo above: New officers of Association of American Fertilizer Control Officials at Shoreham Hotel, Washington, D. C. Front row, left to right: Allen B. Lemmon, retiring president, now ex-officio member of executive committee; Dr. B. D. Cloaninger, Clemson, S. Carolina, president; Dr. F. W. Quackenbush, Lafayette, Indiana, vice-president; and Henry R. Walls, College Park, Md., secretary-treasurer.

Back row: Dr. J. W. Kuzmeski, Amherst, Mass., executive committee; Dr. Bruce Poundstone, Lexington, Ky., executive committee; Dr. J. F. Fudge, executive committee; and Dr. H. A. Halvorson, St. Paul, Minnesota, member of executive committee. (Photo through courtesy of American Plant Food Council, Washington, D. C.)



Three presidents—past and present: left to right: Dr. Cleaninger, newly-elected head of the Association of American Fertilizer Control Officials confers with his predecessors. In center is Allen B. Lemmon, retiring head of the Association, and at the right is Dr. D. S. Coltrane, Commissioner of Agriculture for North Carolina, Raleigh, first president of the Association. (Photo courtesy of American Plant Food Council, Washington, D. C.)

Toxicology Discussed

JUSTUS C. Warr, chief of the Pharmacology and Rodenticide Section of the Production and Marketing Administration, Washington, D. C.; discussed the question, "Are the Newer Economic Poisons Too Dangerous?" He pointed out that not all of the newer economic poisons are highly toxic, but that the development of specifics has largely characterized many of the lately-introduced materials. The major aims of the industry now are toward the development of materials which will do an effective job on agricultural pests, but at the same time will be harmless to desirable insect life and plants and animals. "What is needed," he said, "is a product as effective as '1080,' and as safe to use as red squill." The substitution of safe materials for those of high toxicity should be regarded as making progress, Mr. Ward declared. He continued by reciting a list of the newer toxicants, then stated that the problem is not as acute as it appears at first glance, because of the specificity of most of the materials. Many of these products were developed during the war years because of a need for more potent toxicants, he explained, and, using DDT as an example, said that despite the expenditure of many thousands of dollars in research, many of the answers are still elusive. He observed that some insecticides are more toxic than DDT, and others less toxic, but none have as yet been classified by the Pharmacology and Rodenticide Section as "highly toxic."

The manufacturer must learn all he can about any given product before placing it on the market, Mr. Ward said. Moreover, knowledge is not complete without full information

on the diluent to be used, the sticker and spreader, and particle size of these, he said. The active principle is not the only item to measure. He urged manufacturers to weigh all of the facts, then print labels which are well on the side of safety.

In asking the question, "How far should controls go," he stated that the answer lies in controlling pests and protecting the public. The obscure phases of insecticidal action . . . its effect on edible fruits and vegetables; its cumulative action in the soil; how long a toxicant will remain effective; is a rotation of insecticides feasible, or can one continue to use the same material indefinitely, were pointed out as being of great concern.

Large additional amounts of money and hours of work must be spent in research before all the answers will be known. Labeling itself is not the answer, Mr. Ward said, but it leads in the right direction, since education on use of the product is the ultimate solution. In the meantime, the industry and the public can not afford to be complacent, but through research, proper use of materials already on the market must be thoroughly learned.

Formulation Stressed

S. A. ROHWER, assistant chief, Bureau of Entomology and Plant Quarantine, U.S.D.A., told the group that much serious thinking is needed in the industry regarding use and marketing of the new toxicants. He pointed out that during the war years, the U. S. produced record crops to feed most of the world, and these crops were harvested without the benefit of any of the new postwar insecticides. He stated that many of the new products are no more toxic

than old standbys such as nicotine, arsenic and fluorine, all of which were used safely for many years. Much of the present worry is caused by an accentuation of the dangers. Fear of poisoning the soil, of killing predators, exterminating wild life etc. are not new, he said.

Describing what he believes to be the greatest problem in the use of new materials, Mr. Rohwer declared that attention to formulation is of primary importance. He used as an example, the failure, in some cases of dusts to control cotton pests during the 1948 season. The modifying of wetting agents, even to a small degree, can be the difference between control and failure, the BEPQ assistant chief said. Plant injury can result from such a change, also.

The economic poisons control official must have full information on the inerts in a given formulation. He emphasized that performance depends upon the finished product, and that a change in the solvent affects the entire product. He said that the problems are so far-reaching, that it will be years before all of the answers are known.

Mr. Rohwer then stated that labels should disclose fully the inert ingredients as well as the active ones, so that the complete story may be seen. He expressed doubt that the public may be protected adequately when labels name the active ingredients amounting to one or two percent, and fail to list the inerts which comprise the other 98 percent.

The afternoon was devoted to a session of control officials during which time the reports of association committees were heard. Present at the second annual meeting were representatives from 28 states, Canada,

and the Territory of Hawaii. Of the total registration, about half were representatives of the manufacturing industry, with an additional group from the U. S. Department of Agriculture.

Fertilizer Group Meets

THE second annual convention of the Association of American Fertilizer Control Officials convened on Sunday, October 10, the day following the A.E.P.C.O. The group named as its president, Dr. B. D. Cloaninger, Clemson, S. Carolina, who succeeds Allen B. Lemmon, Sacramento, California. Mr. Lemmon now becomes an ex-officio member of the Association's executive committee. The new vice-president, succeeding Dr. Cloaninger, is Dr. F. W. Quackenbush, Lafayette, Indiana. Henry R. Walls, College Park, Md., succeeds himself as secretary-treasurer.

The group also elected three new members of the executive committee: Dr. H. A. Halverson, St. Paul, Minn. for a one year term; Bruce Poundstone, Lexington, Ky. and J. W. Kuzmeski, Amherst, Mass., to two year terms.

In his presidential address, Mr. Lemmon discussed "Current Problems in Law Enforcement," pointing out that the bumper crops being harvested in the fall of 1948 are largely due to increased use of commercial fertilizer materials. He stated that use of these materials is likely to continue, and that with bumper crops, come also "bumper problems" for fertilizer control officials, with significant increases in the total amount of work to be done.

The A.A.F.C.O. president pointed out some of the difficulties for control officials in determining the value of numerous fertilizer materials now on the market, including liquid products, and organics about which he remarked parenthetically, that

despite the continual clamor of the proponents of organics, these materials alone could not begin to supply the total plant food for today's needs. He told of other shady dealers on the coast who attempt to sell a wide variety of "soil conditioners" ranging from earthworms to cactus juice.

Problems being brought up by the addition of insecticides and weed killers to the fertilizer were discussed by Mr. Lemmon who said that the difficulty is one of classification. Does the bag in question contain fertilizer mixed with weed killer materials, or vice versa? He said that the west is turning more and more to the use of liquid fertilizers, and that some of these materials are potentially dangerous to the user. Containers holding such should have caution labels similar to those on economic poisons, he said.

Technical problems are becoming more numerous as more fertilizer elements are added, he said. The presence of micro nutrients is one problem, he said, which is too complex to warrant an over-all recommendation. These may have to be handled on a prescription basis.

F. S. Lodge, interim president of the National Fertilizer Association, in his remarks to the assembly, pointed out the great advances made by the industry since its early days. He told of some of the slipshod methods of testing fertilizer materials in by-gone days, and contrasted them with the relative accuracy of modern methods

Group at head table at dinner given by American Plant Food Council in honor of Association of American Fertilizer Control Officials at Shoreham Hotel. (Left to right) G. F. MacLeod, Sunland Industries, Inc., Fresno, Calif., representing the California Fertilizer Association; Dr. B. D. Cloaninger, newly-elected president of A.A.F.C.O.; Clifton A. Woodrum, president of the American Plant Food Council, Washington, D. C.; Allen B. Lemmon, retiring president of A.A.F.C.O.; and Dr. Frank W. Parker, assistant chief, Bureau of Plant Industry, U.S.D.A. (Photo courtesy of American Plant Food Council)

of inspection. The sampling problem is with us yet, he stated, and went on to say that new raw materials pose new problems in sampling.

Clifton A. Woodrum, president of the American Plant Food Council commended the fertilizer control officials for their contribution to American agriculture. He stated that the human race is becoming soil conscious, although it is difficult to convince the public that the soil is "going to pot" when bumper crops are produced with regularity. There has always been good soil and bad, he said, and it will always be that way.

He recommended that soil diagnosis be accepted universally so that correct analyses of fertilizer may be applied . . . the fertilizer industry is anxious to provide the best materials recommended by the "plant doctor." Present-day shortages of raw materials, particularly nitrogen, were discussed by Mr. Woodrum, who went on to say that the industry desires to cooperate with the control officials for the betterment of agriculture in general.

The remainder of the morning's program consisted of reports of investigators. Dr. St. John discussed general fertilizer terms; Paul Ijams, Topeka, Kansas, showed the group samples of registration forms used by various states; Mr. Poundstone reported on state publications; and M. P. Etheredge, State College, Miss., spoke on organic nitrogen products.

Inorganic nitrogen products were reported by Mr. Kuzmeski, while Dr. J. F. Fudge, College Station, Texas, discussed phosphorous. Potash was reported by R. W. Dudwick, State College, New Mexico; calcium and magnesium by W. B. Griem, Madison, Wisconsin; and manganese by J. B. Smith, Kingston, R. I.

(Turn to Page 66B)





GROVER C. GRUB

BUGTIME Stories

by ORBIS

GRACE GRUB, Grover Cleveland Grub's mother, wanted her son to be President when he grew up. She even named him after her favorite one. It was a fine name, but it didn't fire ambition in Grover. He was as lazy as they come—so lazy that he insisted on burrowing in the backs of prize cattle. That saved walking, because the cattle carried Grover around.

Grover wasn't grateful, however. Instead of appreciating riding, snug and warm, under the hide of the cow's back, he began migrating through her body. This made the cow uncomfortable—her growth was arrested, she didn't gain weight and she gave less milk.

One morning as Grover was pushing himself, hind end forward, through his hole in the cow's hide . . .

—he ran into an Orbis Insecticide, and that was the end of Grover C. Grub!

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How Seabrook Farms Steps Up Vegetable Crop Yield With

COMMERCIAL FERTILIZER

MODERN production on the average vegetable farm today is dependent upon the intelligent use of commercial fertilizer. To get higher yields, it is important that sufficient amounts of the right kind of fertilizer be applied properly. Too little or too much fertilizer, improperly balanced, or applied incorrectly, can bring disaster to a vegetable crop production program, no matter how well the other phases of the program may be planned.

If these facts are valid for the average sized vegetable farm, they are definitely important for Seabrook Farms, the largest vegetable farm in the world, where in 1947, approximately $\frac{1}{3}$ million dollars were spent to fertilize about 14,000 acres of vegetables. This area was devoted largely to growing lima beans, peas,

spinach, sweet corn, beets, and carrots. How such a large amount of fertilizer was used on this mechanized farm may be of considerable interest, since some of the Seabrook concepts in the use of fertilizer are new and different from those in common practice.

Fertilizer Grade, Amount

SEABROOK depends almost entirely upon results of rapid soil tests to determine the amount and grade of fertilizer to use. The soil tests have been described in detail elsewhere (1). Organic matter, pH, soluble N, P, K, Ca and Mg are determined as routine procedure on

Spreading bulk fertilizer on a cover crop. Such fertilizer increases yield of cover crop and provides an excellent source of nutrients for succeeding crop.

By Benjamin Wolf

Seabrook Farms, Bridgeton, N. J.

some 5,000 soil samples annually on which fertilizer recommendations are based.

The pH, Ca and Mg tests are used for determining lime needs. Lime needs are first to be considered because of their overall effect upon availability of nutrients and plant growth. Soil pH values are maintained between 6.0 and 6.5 and both calcium and magnesium are also maintained at good levels. Results of organic matter tests are used for determining need for special organic matter practices and indication of nitrogen needs of the soil.





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Experience shows that where there is a lack of balance in the magnesium content of their soils, they are obtaining earlier maturity, higher yields, improved quality crops and increased acre values by the use of *Sul-Po-Mag*.

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Sul-Po-Mag is a properly balanced combination of magnesium and potash formed by nature in the mineral langbeinite, mined and refined exclusively by International at its mines at Carlsbad, New Mexico. Both the magnesium and potash are in water-soluble form and are quickly available to crops.

You will find in *Sul-Po-Mag* the same free-flowing, easy-handling qualities which have made International Sulfate and Muriate of Potash the choice of so many fertilizer manufacturers. *Potash Division, International Minerals & Chemical Corporation. General Offices: 20 North Wacker Drive, Chicago 6.*

**SUL-PO-MAG (Water-Soluble Double Sulfate of Potash-Magnesia)
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TABLE I

The level of various soil factors (a) associated with good yields of several vegetable crops under South Jersey conditions

Soil Factor	Peas	Lima Beans	Spinach	Tomatoes	Asparagus
pH	6.0-6.5	5.5-6.5	6.0-6.5	6.0-6.5	5.5-6.5
Organic Matter % (b)	1.5-	1.5-	2.0-	2.0-	1.0-
Nitrogen	25-100	10-50	100-150	25-100	25-100
Phosphorus	10-30	10-30	10-30	10-30	30-
Potassium	100-200	100-200	100-200	100-200	300-
Calcium (c)	1000-	1000-	1500-	1000-	1000-
Magnesium (c)	100-	100-	100-	100-	100-

(a) The amounts of nutrients are based on a one minute extraction of 1 part soil to 2 parts Morgan's Universal Extracting Solution. They are recorded in pounds per 2,000,000 lbs. of air dry soil or approximately one acre to a depth of $\frac{1}{2}$ inches.

(b) There is evidently no upper limit providing other factors are satisfactory.

(c) The upper limit has not been established and it may be quite variable depending upon exchange capacity.

Yields of crops have been closely correlated with various soil tests and the amounts of fertilizer required to change from one level to another have been approximated. It is, therefore, possible to adjust soils, at least from a chemical basis, for the crop that is to be grown. The amounts of N, P_2O_5 and K_2O necessary to bring the soil to optimum levels can be calculated from soil test data and the amounts of fertilizer

applied to the soil to meet such requirements. The levels of nutrients considered optimum for several crops are listed in Table 1. The amounts of N, P_2O_5 and K_2O needed per acre for several crops grown on soils with different soil test results are given in Table 2.

With an element as leachable as nitrogen, it is necessary for best results to run additional soil tests after the crop has made some growth.

Nitrogen applications are then made, if needed, to bring the soil level to an optimum.

While dependence is placed primarily upon soil tests for determining fertility needs, plant tests for both soluble and total nutrients have been used to define more accurately Seabrook's soil test standards. The plant tests are also useful in diagnosing causes of poor plant growth.

By basing fertilizer applications upon soil test results, it has been found that there is no such thing as a "spinach fertilizer" or a "bean fertilizer," etc. Actually, the same fertilizer may be used for different crops if grown in different fields.

It would seem at first glance, that a large number of grades would be necessary to meet the requirements of different crops on different soils. However, about 5 different ratios (1-3-4, 1-3-2, 1-2-2, 1-2-1, and 1-1-1) supply about 95 per cent of the fertilizer being used. Before soil testing was started at Seabrook Farms, one fertilizer analysis (4-12-8) was used on all fields for all crops. The use of 5 analyses today, however, has not unduly complicated farm procedure.

TABLE II

Fertilizer applications for various crops based upon rapid soil tests

Crop	N			P_2O_5			K_2O		
	* If O.M. Tests	And no Manure is Used	** And Manure is Used	If P Test is	And no Manure is Used	** And Manure is Used	If K Test is	And no Manure is Used	** And Manure is Used
PEAS	1.0	125	75	5	160	135	100	150	100
	1.0-1.5	100	50	5-10	120	95	100-200	100	50
	1.5-2.0	75	35	10-25	80	55	200-300	50	0
	2.0	50	25	25	60	35	300	0	0
SMALL SEEDED LIMA BEANS	1.0	50	10	5	160	135	100	150	100
	1.0-1.5	25	0	5-10	120	95	100-200	100	50
	1.5	10	0	10-25	80	55	200-300	50	0
				25	60	35	300	0	0
ASPARAGUS	1.0	125	75	15	240	215	100	250	200
	1.0-1.5	100	50	15-25	200	175	100-200	200	150
	1.5-2.0	75	35	25-35	160	135	200-300	150	100
	2.0	50	25	35	120	95	300-400	100	50
SPINACH	1.0	200	150	5	100	75	100	120	70
	1.0-1.5	175	100	5-15	75	50	100-200	70	20
	1.5-2.0	150	75	15	50	25	100-200	40	0
	2.0	125					300	0	0
TOMATOES	1.0	125	75	5	160	135	100	200	150
	1.0-1.5	100	50	5-10	120	95	100-200	150	100
	1.5-2.0	75	35	10-25	80	55	200-300	100	50
	2.0	50	25	25	60	35	300	50	

* Percentage organic matter.

** Based on an application of about 5 tons poultry manure. It is inevitable that application of manure introduces variations that are difficult to adjust. Amounts of fertilizer are calculated to give a sufficient amount of nutrients despite low nutrient content in some manure.

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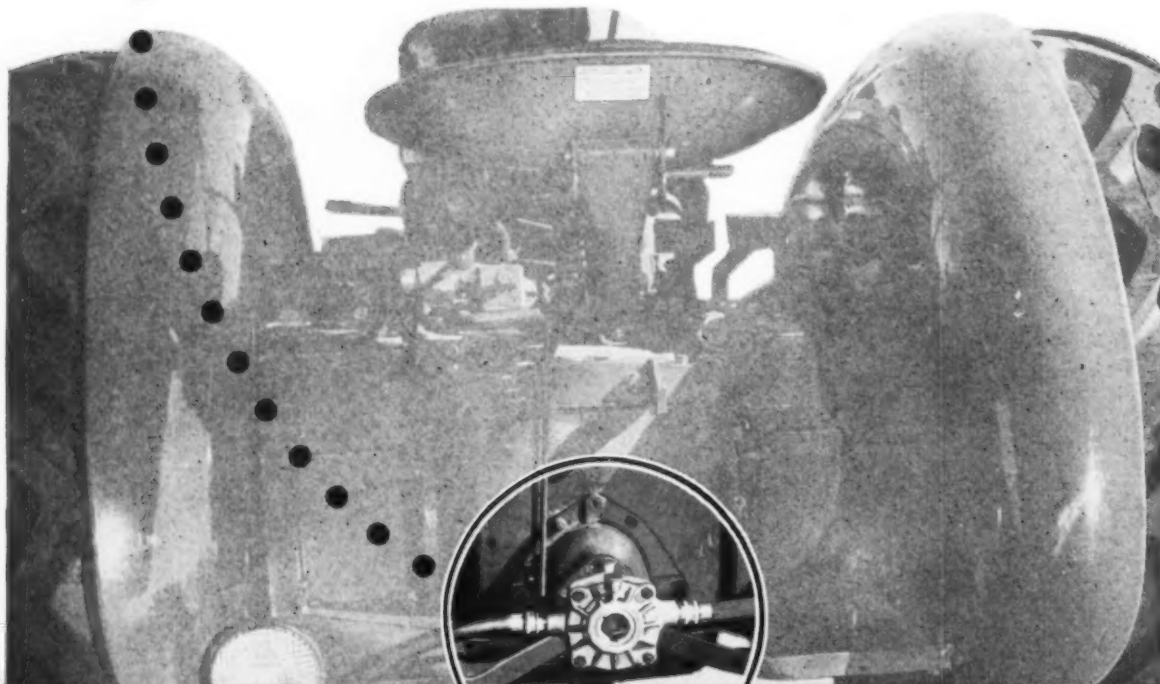
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We feel that we are now supplying fertilizer analyses that fit plant needs more closely and at times this is being done, at a saving over previous methods.

The most striking change has been prompted by the presence of large amounts of available P and good supply of K but a shortage of N in the soil. To supply plant food that more closely meets the nutrient requirements, sizeable portions of Seabrook's acreage have been fertilized with analyses such as 8-8-8 or 10-10-10. In many cases, the application of about 1000 lbs. of a 10-10-10 has replaced the former 1500-1800 lbs. of 4-12-8. Greater amounts of N, (an element in short supply in our soils) have been obtained at the expense of large quantities of P and some K, elements which are generally high or good. This shift in fertilizer policy saved about \$50,000 in 1947 fertilizer costs besides making possible better crops than ever before.

Fertilizer Ingredients

INORGANIC ingredients are used almost entirely in our fertilizers. Although there have been debates on the respective merits of organic vs inorganic fertilizers, and the matter has not been completely settled, there has been much less controversy at

Seabrook farms since data has been obtained from several tests, one of which is given in Table 3. Various nitrogenous materials were used to grow spinach. Of materials used and all applied before planting spinach, ammoniated superphosphate gave best results. This was far superior to N in a natural organic (fish meal) or synthetic organic ("Uramon").

The bulk of N in mixed goods is derived from ammoniated superphosphate with a small amount coming from ammonium nitrate and sulfate of ammonia. Wherever possible, ammoniated superphosphate as source of N is insisted upon because of all the materials used, it has shown greatest resistance to leaching. The phosphate is generally supplied from ammoniated super and run-of-pile super, and potash is supplied from muriate of potash.

The trace elements, boron and manganese, are added to all fertilizers, the amounts depending upon the analysis of fertilizer and the crop for which it is to be used. For example, if 4-12-8 is to be used for peas, about 5 lbs. borax and 10 lbs. "Tecmangam" are added to each ton of fertilizer. Generally about 1500-2000 lbs. of this fertilizer per acre are needed. If, however, 10-10-10 fertilizer is being used, about 10 lbs. of borax and 20

lbs. "Tecmangam" are included per ton because the rates at which 10-10-10 is used are considerably less than that for 4-12-8. The rate of borax is increased for root crops such as beets, and rates of borax and "Tecmangam" are increased for soils having pH values over 6.5.

Methods of Application

THE efficiency of fertilizer is often determined by the manner in which it is applied. It has been found at Seabrook that on our relatively light soils maintained at pH of 6.0-6.5 and where phosphate fixation is of minor importance, best results are obtained by broadcasting fertilizer and plowing it under. Another reason why this has worked out advantageously has no doubt been the large amounts of fertilizer used. This procedure has given yields much less subject to damage from drought.

In recent years it has been found that by making the fertilizer application to an established cover crop in the fall, good yields of the succeeding crop are obtained in the spring. No fertilizer is applied immediately before planting the crop. This system has several advantages which include increased yields of cover crop with better erosion control and the practical use of fertilizer in bulk.

Broadcast applications lend themselves very nicely to the use of bulk fertilizers. The GLF Cooperative is now applying such bulk fertilizers to Seabrook fields at a cost which compares to delivered price of bagged fertilizer. This application at no additional cost is made possible by savings in bags and handling costs.

The application of fertilizer is accomplished by loading five to eight tons of fertilizer in bulk on a modified truck. The truck spreader is designed to provide a uniform feed regardless of the speed at which the truck is driven. The twin distributing fans at rear of truck are driven by an auxiliary motor to insure uniform width of spread. The rate of application is determined by size of feed gate opening and the width of the land the operator selects.

The truck is loaded at the fertilizer factory with either cured or
(Turn to Page 73)

TABLE III

Yields of Spinach as influenced by different sources of N in the mixed fertilizer*

Source of Nitrogen	Relative Yield**
Check, No. N, O-12-8	100
All N from nitrate of soda	130
2/3 N from nitrate of soda, 1/3 from fish meal	175
1/3 N from nitrate of soda, 2/3 from fish meal	200
All N from ammonium nitrate	201
3/4 N from ammonium nitrate, 1/4 from fish meal	212
2/3 N from ammonium nitrate, 1/3 from fish meal	204
1/3 N from ammonium nitrate, 2/3 from fish meal	223
All N from ammoniated super	275
2/3 N from ammoniated super, 1/3 from fish meal	259
1/3 N from ammoniated super, 2/3 from fish meal	203
3/4 N from Uramon, 1/4 from fish meal	257
2/3 N from Uramon, 1/3 from fish meal	247
1/3 N from Uramon, 2/3 from fish meal	238
All N from fish meal	237
1/3 from nitrate of soda, 1/3 ammonium sulfate, 1/3 fish meal	236
1/3 from nitrate of soda, 1/3 ammonium sulfate, 1/3 Uramon	217
Commercial fertilizer, Brand A	290
Commercial fertilizer, Brand B	287

* All fertilizers with exception of check had a 4-12-8 analysis and were applied at rate of 2000 lbs. per acre. Check received 2000 lbs. of O-12-8.

** Average of 3 soils with triplicate treatments for each soil.

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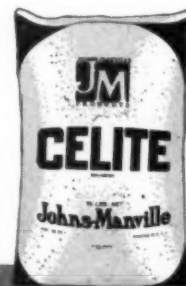
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In keeping with our desire to furnish subscribers with pertinent information about supply conditions of raw materials used in the agricultural chemical field, we present this report, the first of a monthly series of articles on the subject. The author is intimately associated with the industry and its supply problems and has an impressive background gained while connected with the War Production Board's Insecticide and Fungicide Unit during World War II. We feel he is well qualified to conduct this series of articles.

This article and subsequent ones, will give current supply and price information, with an analysis of the background to determine the changes that may occur. It will also predict market trends on various chemicals used in these fields.—EDITOR

THE chemicals for the insecticide, fungicide and herbicide fields for the next season appear at this writing to be in a comfortable supply position. In general, this same condition has existed for the past twelve months, but it is clearly indicated now that the average manufacturer can pick his source of supply and pretty much schedule his preferred date of delivery.

DDT, now in its adolescence, has finished the pains connected with its growing stages and appears to be settling down to take its place among the other heavy chemicals. Many persons in the trade believe that with increased costs of raw materials and increased freight rates, there is likely to be another increase in the price of technical as well as the price of DDT compositions.

It will be recalled that about September 1, 1948, there was an increase in the price of the technical grade from 29c per pound in carload lots to 34c per pound. These prices were f.o.b. producers' plants with certain freight equalization points.

From production figures available to date, it appears that production of technical DDT during the calendar year 1948 will be in the neighborhood of 35 million pounds. This compares with a 1947 production figure of 50,081,000* pounds, 1946

production figure of 44,577,945,* and a 1945 production figure of 32,998,587* pounds.

What effect foreign requirements will have on additional quantities of DDT being necessary is difficult to evaluate, but there has been some activity in the past months on quantities of material which were financed, for the most part, by Economic Cooperation Administration funds. On the other hand, there are indications of DDT production in other countries. Egypt and China, among others, have recently reported their own productions of technical DDT.

What effect the reported resistance of flies to DDT, as well as the residual toxicity problem will have on demands of DDT for next year cannot be evaluated too clearly at this time.

Rotenone

ROTENONE has been quite a football in the past 3 to 4 months. Current quotations are 31c

BULLETIN

At press time, Julius Hyman & Co., Denver, had announced a reduction in the price of agricultural and refined grades of "Octa-Klor," chlordane. The company did not state what the new price would be.

per lb. for 5% material in car load lots, but it is known that some quantities of material during the past month have moved at the 29c level.

Industry spokesmen feel that a degree of stability in the domestic price is needed since at the current fluctuating quotations there is not much crude root being harvested overseas.

* U. S. Tariff Commission figures.

It is believed that stocks of ground root in trade channels are substantial. The outlook for new materials from South American and Far Eastern markets is not too good at this time for material to arrive in time for next season's use.

BHC Picture

BHC during the past season was in fairly plentiful supply even though during the earlier part of the year there were indications of local shortages. It is evident now that the major use of BHC lies in the control of insects on cotton. There are other uses, including export demand, but they do not appear to account for any active steady demand of large tonnages.

In addition to the producers of BHC last year—Westvaco, Commercial Solvents, Pennsylvania Salt, Hooker, General Chemical Company and J. T. Baker—the press has recently indicated that the Ethyl Corporation is coming into production and the DuPont operation in Texas will be in early next year. Most industry sources feel that there will be a comfortable supply of technical BHC next year.

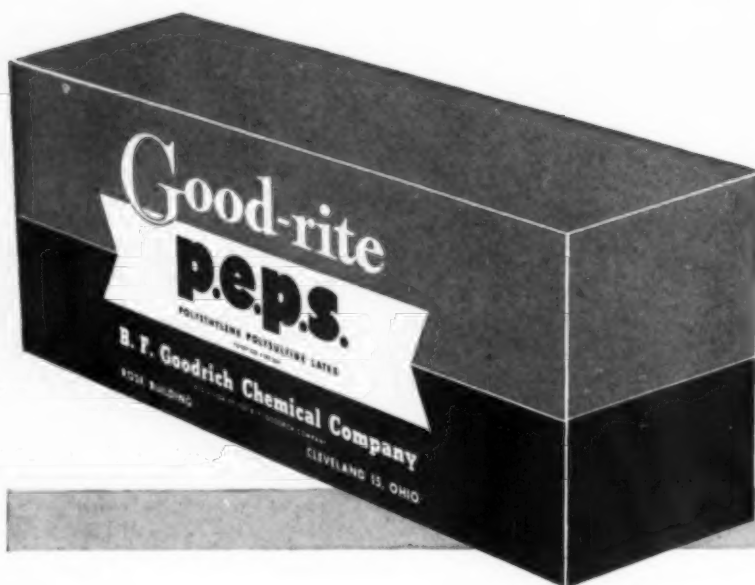
BHC was available during the early part of last season at 33c per lb., basis 12% gamma content. Recently some quarters were quoting 33c per lb. in carload lots. Industry spokesmen feel that the price next season will start at around 30c per lb.

Pyrethrum

THE demand for pyrethrum has been only fair during the past few years but it now appears that there will be a tight supply for the

(Turn to Page 70)

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The Listening Post

Virus Yellows of Strawberry Observed

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Survey, Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller



STUDY of virus yellows of strawberry in the eastern part of the United States has been carried out during the past season by members of the U. S. Bureau of Plant Industry, Soils and Agricultural Engineering, and the North Carolina Agricultural Experiment Station.

The tests began in 1947 when a two-acre field in a North Carolina Strawberry section was set with plants which came from two sources. Six rows were set along one side with the owner's plants, and the remainder of the field (40 rows) with plants purchased from a strawberry-plant growth in another State. The variety was the Massey, which is normally vigorous in that section and which forms runners freely. The field developed a trouble which was difficult to diagnose satisfactorily, and in May, 1948, was inspected by members of the Bureau of Plant Industry, and the N. Carolina Experiment Station.

At that time, the six rows set with the owner's own plants were normal in appearance and made a good bed as the result of heavy runner production. The leaves were normal in size and the petioles or leaf stalks stood upright. The crop yielded well.

The remainder of the field was in striking contrast: the plant stand was thin as the result of meager runner production, and both mother and runner plants were dwarfed, with small leaves, short petioles, and a general appearance of weakness. The grower reported harvesting less than half a crop from this portion, as compared with the other six rows. Large

normal-appearing plants were scattered in occasional clumps or short row sections through this thin part of the field, standing out in marked contrast to the dwarfed and weak plants composing the bulk of the rows. The owner reported that these scattered vigorous clumps had developed from plants of his own stock used to reset in spaces where the original plants had died.

J. B. Demaree of the Bureau of Plant Industry, Soils, and Agricultural Engineering, who reports this occurrence, has studied the strawberry yellows virus disease during the past six years. In his opinion the abnormalities noted in this North Carolina field were typical symptoms shown by some eastern strawberry varieties when infected with yellows. It was concluded that the imported plants set in the field were all infected with the disease. The six rows of healthy plants helped in determining the cause of the unsatisfactory growth and low yield in the major portion of the field; without them the dwarfing could well have been thought to be due to poor cultural practices, insufficient soil nutrients, etc. The white strawberry aphid, *Capitophorus fragaefolii*, is the vector, or carrier of this virus. It was also found in this field and its presence supports the diagnosis.

Yellows was diagnosed in a field of the variety Catskill in Pennsylvania in 1948. The rows were thin, the plants dwarfed and weak, and the field was so poor that it was plowed under before fruiting.


Strawberry breeding plots at

Beltsville, Maryland were abandoned in 1947 because yellows, which had been present for several years, increased to a serious extent. Occurrence of yellows in New Jersey has been known for some time.

Yellows or "xanthosis," virus disease of strawberries has long been a limiting factor in the growing of this crop in the Pacific Coast States. Symptoms characteristic for the varieties grown in the West, including Marshall and varieties related to it, are described as follows: crinkling, curling and usually upward cupping of leaves; marginal ("yellow-edge") and interveinal yellowing of leaflets; dwarfing of leaves, both petioles and blades; and stunting of growth of the entire plant. Not all these symptoms may show at one time; in fact, all except the dwarfing tend to disappear during the summer. The yellowing of the leaves from which the disease got its name becomes almost entirely masked, or suppressed, under high temperatures and appears only in spring and again in autumn.

Marshall and its relatives are not suitable for growing east of the Rocky Mountains. Eastern varieties differ considerably, both from Marshall and among themselves, in their reaction to yellows infection. Some show only dwarfing of plants; others, cupping of leaves or interveinal yellowing in addition to dwarfing; in some there is very little dwarfing but complete, or nearly complete, absence of runner production; in still others all symptoms may be entirely or almost entirely masked. Symptoms are more evident in the second year.

The conspicuous yellow-edge leaf symptom, which is the most definite sign for recognition of yellows, does not show up as clearly in eastern varieties as it does in Marshall. Mild to moderate cases of yellows could easily be confused with ordinary dwarfing due to unfavorable growing conditions. Consequently, the possibility of widespread prevalence and importance of the disease in the eastern United States has not generally been recognized. The surest method of demonstrating the presence of the yellows virus disease in eastern varieties is by grafting to a virus-free



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plant of a variety that develops the characteristic yellows symptoms, such as Marshall. If the virus is present in the plant being tested, it will be transmitted through the graft into the Marshall plant, which will show up the virus by characteristic reaction to infection and is therefore called an "indicator" plant. Mr. Demaree has grafted a considerable number of varieties, from several eastern states, to Marshall. Most varieties have transmitted yellows to the indicator plants, but it is believed that the greatest concentration of virus-infected plants is in the middle Atlantic States. Plants free from yellows were seldom found in some of the older

varieties, and stocks of even some of the newer sorts showed virus.

Two methods for remedying the strawberry-virus-disease problem in eastern United States have been suggested. The first is a temporary method for immediate application, which consists in the recommendation that in setting new fields, growers should use only vigorous plants making runners, freely, having large, green, smooth leaves with upright petioles, and taken only from fields known to have been productive.

The slower but more permanent method is the testing, or indexing, of the more desirable varieties
(Turn to Page 75)

Insect Situation in Late September, Early October



This column, reviewing current insect control programs, is a regular feature of **AGRICULTURAL CHEMICALS**. Mr. Haeussler is in charge of Insect Pest Survey and Information, Agric. Research Adm., B. E. & P. Q., U.S.D.A. His observations are based on latest reports from collaborators in the department's country-wide pest surveys.

By G. J. Haeussler

INFESTATIONS of the Mexican bean beetle have been generally light to moderate in all districts reporting during the last half of September and first half of October. However, the pest has continued to be abundant on snap beans in Virginia during the entire period and several unusually late severe infestations were reported from New Jersey shortly after mid-September. A report from Mississippi toward the end of that month indicated that infestations were heavy in several counties and that the insect was found for the first time in Coahoma County, Mississippi.

The bean leaf roller was reported during late September or early October occurring widely, in light to moderate abundance on beans in Virginia, South Carolina, Georgia, Florida, and Mississippi. The corn earworm was fairly numerous on beans in Virginia during most of the period, a serious infestation occurred on lima beans in Ventura County,

California in late September, and light infestations were present on snap beans in parts of South Carolina toward the middle of October. Cutworms ruined a considerable acreage of lima beans in the lower Rio Grande Valley of Texas during the last half of September and moderate infestations of the bean thrips and whitefly were reported on young snap beans in the Coachella Valley of California at that time. Around the first of October the lesser cornstalk borer severely injured fall beans in Pearl River County, Mississippi, and cowpeas in the vicinity of Meridian were damaged by stink bugs. *Lygus* bugs were seriously infesting beans in the Oxnard district of Ventura County, California toward the middle of the month.

Cabbage caterpillar populations were generally light to moderate in most areas during the last half of September and reached a relatively low point by the end of that month in all districts from which reports

were received. By the middle of October, moderate to heavy populations were reported from parts of Georgia, Florida, and Alabama, while lesser numbers occurred on cabbage and related crops in Virginia, South Carolina, Mississippi, and California.

Aphids were reported during the last half of September to be abundant on young kale and collards in Virginia, light infestations were present on turnips in Georgia and Florida, and they were serious on cabbage and related crops in South Carolina and southern California. Aphid infestations on crucifers continued moderate to heavy in southern California during the first half of October, but were generally light at that time in all other districts.

The melonworm and pickleworm have continued troublesome in many areas. Infestations requiring insecticide control were reported from South Carolina shortly after the middle of September and the pests were reported as present on cucurbits in varying abundance during the rest of that month or in early October in Virginia, South Carolina, Georgia, Florida, Louisiana, and Texas.

During the early part of October the Hawaiian beet webworm, the corn earworm, and the fall armyworm were observed attacking spinach in Virginia. Spinach pests were at a very low level in New Jersey by the end of September.

Toward the end of September, hornworms were unusually abundant on tomato, potato, eggplant, and pepper in New Jersey and were numerous on tomato in Florida. Heavy infestations of the tomato fruitworm and lighter infestations of hornworms, fall armyworm, and southern armyworm occurred on tomatoes in Florida early in October. Aphids were numerous and destructive at that time on tomato in parts of Alabama and Southern California. A heavy infestation of the serpentine leaf miner continued on tomato in the latter area until it was retarded by cooler weather toward the middle of October. A very heavy infestation of that pest occurred during the first half of October on several hundred acres of cantaloup in Fresno County, California.



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Technical Briefs

DDT-BHC for Borers

Spraying tests to determine the effectiveness of DDT and benzene hexachloride for control of peach tree borers were being made this fall by the Georgia Agricultural Experiment Station, Experiment, Ga. Results reported as of October 1, indicate that the new spray will be effective, but no recommendations can yet be made, the bulletin says. The trunks of the peach trees were sprayed once every three weeks with the material, beginning August 6. The third and final application was made September 20. The borer was previously controlled by using emulsions of ethylene dichloride and para dichlorobenzene, the Station says.

TEPP For Greenhouses

Tetraethyl pyrophosphate has been approved by University of Illinois entomologists as an effective greenhouse insecticide, after experimental investigations on the Urbana campus, financed by the Commercial Flower Growers of Chicago, a trade group of Chicago-area commercial florists. In a report presented at the organization's first fall meeting, Sept. 21, the flower growers were told that TEPP can be used with no injury to greenhouse flower crops, for control of red spiders and other pests. Its convenience was emphasized and with proper precautions, it was stated, there is no apparent hazard to the operator.

TEPP, vaporized by application to a cold pipe and then turning on the steam, is a practical and very economical method, the Illinois investigation established, but whether this method or the aerosol bomb is used, the report adds, depends on individual range conditions, time of year and other factors.

In the test xylene was used as a carrier and as little as $\frac{1}{2}$ c.c. of TEPP per 1,000 cu. ft. of space gave good kills of aphids and motile stages of red spiders. Many different types

of common greenhouse plants were treated with practically no injury.

Parathion, dissolved in xylene was also applied to steam pipes in houses containing roses, carnations, chrysanthemum and tropical plants. When used in February it apparently caused severe yellowing and leaf fall of roses, but this did not occur after treatment in May. Parathion has great killing power and is effective for some time after application, the report states, but great precautions are necessary for its use.

Prof. Stanley Hall and floricultural associates who conducted the work at the University of Illinois, attended the Chicago meeting to report on the project. Credit was given to Victor Chemical Works, Chicago, and American Cyanamid Co., New York, for supplying chemicals, and to Smith Equipment & Sup-

ply Co., and Gullett & Sons, Lincoln, Ill., for providing aerosol bombs.

Climatic Factors Studied

Studies were recently made at Cornell University, Ithaca, N. Y., into the influence of climatic factors on the active ingredients and diluents used in insecticidal dusts. Median lethal deposits were established for 16 diluents and the deposit for each was found to be influenced by both temperature and relative humidity.

"Thus it was hardly surprising," says the report, "to find that when using Barden clay, for example, the toxicity increased as temperature increased, and as relative humidity decreased. Two apparent factors were found to be involved in the toxicity of mixed dusts in which the direct action of the diluent is generally regarded as being one of abrasion. At low relative humidity the resultant dessication is strongly pronounced, while at higher relative humidity the effect of permitting more rapid entry of the toxicant through the insect cuticle may be more important."

Derris Growth in United States is Tested



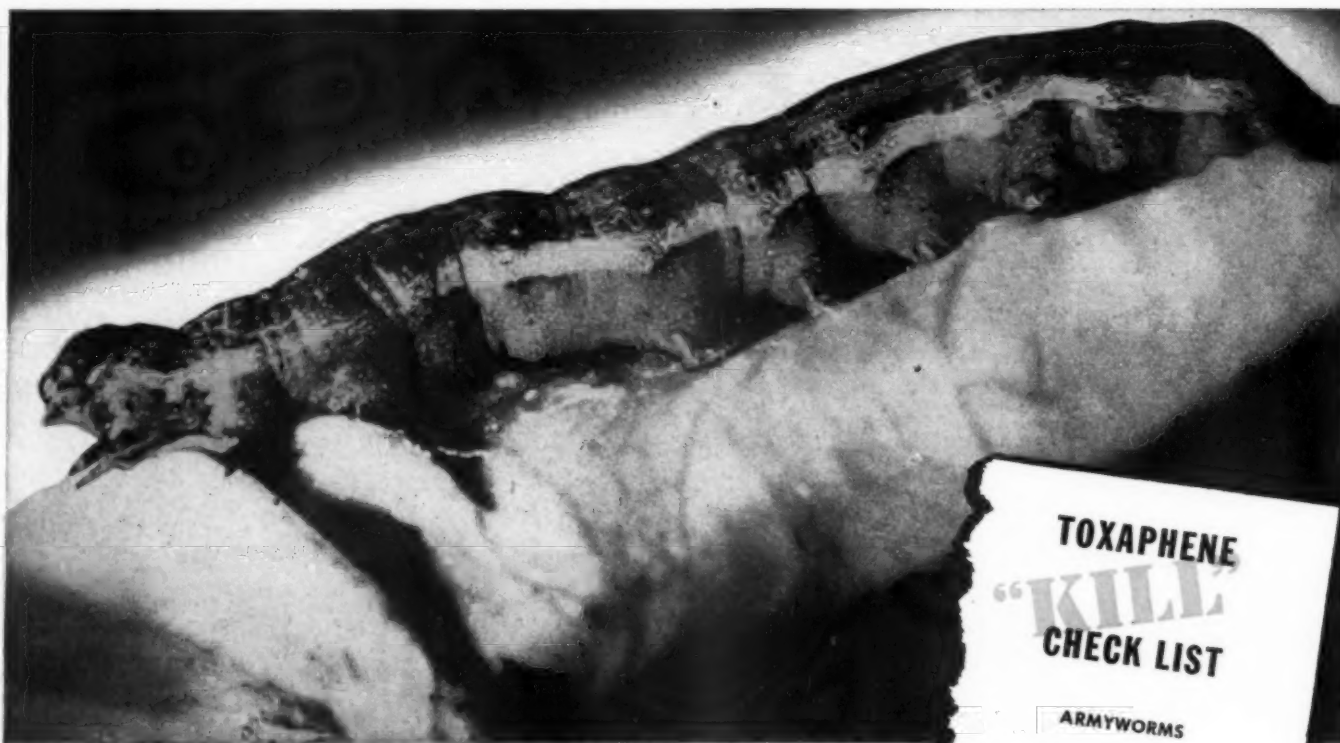
E. G. Kelsheimer, entomologist at the Florida Agricultural Experiment Station, Bradenton, Fla., has made a progress report on a test plot of *Derris elliptica* growing at Bradenton.

Some 600 plants from the U.S. Plant Introduction Garden, Coconut Grove, Fla. were set out at Bradenton in November, 1946. In

the two intervening years, the temperature has not gone below 29° F. at any time, and no protection has been given them other than that afforded by natural grass cover. No plants have been lost from the cold weather, although some have been damaged accidentally by hoe operations.

"These plants have been

Toxaphene Sounds Taps For Armyworms



Regular armyworm (Cirphis unipuncta) feeding on lettuce leaf.



In field tests this year, Toxaphene (chlorinated camphene) stopped the activity of various species of armyworms immediately, including: fall armyworm (*Laphygma frugiperda*), southern armyworm (*Prodenia eridania*), yellow-striped armyworm (*Prodenia ornithogalli*), regular armyworm (*Cirphis unipuncta*), and an unidentified species.

This is just one example of Toxaphene's effectiveness in paralyzing and killing the hordes of insects plaguing money crops.

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- COTTON FLEAHOPPER
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grown on a marl soil," the report continues, "with little attention except for an annual clearing out of grass and two fertilizings with a 4-7-5 commercial mixture. No diseases of economic importance thus far have attacked the plants. One insect, however, the larva of a Phalaenidae moth, *Selenia monotropa* Grote proved of economic importance."

The photo on p. 49 shows the best stand of Derris is in the portion where the grass was not cleared out. The plants to the left were grown under clean cultivated conditions; the ones on the right in Para grass. The amount of grass as ground cover is evident from the piles seen on the far right.

Grain Fumigation

Mixtures containing 2.5-20 percent by volume of ethylene dibromide in dichloromethane were most effective in bin fumigation of grain to control grain-infesting insects. The nonflammable mixtures are poured directly upon the surface of the grain at rates of from 1 to 3 gallons per 1000 bushels of grain, and the bin is closed for 3 days. Treated grain is not impaired as to germinating ability, odor, taste, or baking quality. F. W. Fletcher and E. Kenaga, to The Dow Chemical Co. U.S. Patent No. 2,425,238.

2,4-D Effectiveness Studied

The residual effects of 2,4-D in soil treated for weed elimination vary according to environment, it has been determined by Carl J. C. Jorgenson and C. L. Hamer, Michigan State college horticulturists, and reported in a recent issue of the *Botanical Gazette*.

Three chemically different forms of 2,4-D were used to treat soil which had been inoculated with weed seed containing more than 20 kinds of weeds, grass and clover. Some of the treated flats of soil were kept in the greenhouse, some were placed outside, and others were put under cold storage conditions.

Results showed that soils treated with 8 or 16 parts per million of 2,4-D before weed seeds had germinated were virtually weed-free. The

various temperatures made no difference in the effectiveness of 2,4-D as a weed killer, but the soil remained toxic to economic crops longer at freezing or subfreezing temperatures. Difference in acidity, in the organic matter in the soil, and in the moisture content of the soil, greatly affected the value of 2,4-D as a soil treatment for weed control. On the other hand, the acidity did not greatly affect the rate at which toxicity was lost from the soil.

Fumigants Studied

New York Agricultural Experiment Station reports investigation into the use of various soil fumigants as replacements for steam or chloropicrin. The report states that the suitability of methyl bromide, ethylene dibromide and "DD" mixture has been demonstrated as partial replacements for steam and chloropicrin. The relative merits of these materials has been worked out, as well as the effect of various edaphic factors upon proper dosage rate, phytotoxicity, and fungistatic properties.

"In the two or three methyl bromide preparations now on the market," the report says, "growers have soil fumigants as useful as chloropicrin, against many fungi and lacking some of its drawbacks. In certain ethylene dibromide preparations still being tested they would seem to have a soil nematode and insecticide as cheap and effective as 'DD' mixture, suitable for extensive outdoor employment where no type of seal or aftercover is feasible.

"Although none of the four chemicals mentioned possess all of the necessary characteristics required of an ideal fumigant, they all have some of them, not the least of which is economy, and growers are finding increased uses for them, both indoors and out."

Sheep Tick Control

One dipping in a formula containing 8 ounces of 5 percent rotenone powder, and 2 tablespoonsful of a wetting agent will keep a flock of sheep largely tick-free for a year, according to Cornell Experiment

Station Bulletin 844. It is pointed out that tick populations build up most rapidly during the winter when flocks are kept indoors.

"Dips containing from 0.07 to 0.25 percent of DDT are also effective but somewhat more expensive," the bulletin says. "Formulae based on phenothioxin, fixed nicotine, ground yam bean, 'Thanite' or pyrethrum are highly effective. Each of these materials was used in combination with wettable sulfur. Wettable sulfur alone, while somewhat less effective than the combinations above, gave a high degree of control over a period of weeks.

"Power-dusting with a 1-10 mixture of 5 per cent rotenone and pyrophyllite gave good commercial control of ticks on feeder lambs for a period of several months. The dust was more effective when 2 per cent of light motor oil was added.

"Sheep should be dipped not sooner than two weeks after shearing, and before the new fleece has made noticeable growth.

"Portable vats are the only practical equipment for dipping in areas where flocks are small and widely scattered."

Caterpillar Control Seen

An insecticidal dust mixture composed of 15 percent chlorinated camphene plus 5 percent DDT in 40 percent sulfur has been found in preliminary field tests to give excellent control of salt marsh caterpillars on cotton. These measures were taken by U.S.D.A. entomologists who applied the material at the rate of 20 pounds per acre to control an unusually serious outbreak of the pests in the Salt River Valley of Arizona. The pests were still numerous in untreated areas.

The U.S.D.A. report states that this is the first insecticidal material ever found to give good control of this pest on cotton. Outbreaks in the past have usually run their natural course since previous control methods were unsatisfactory. These caterpillars occur in various parts of the U. S. and Canada, and are not limited to the Salt River Valley of Arizona, as the name might suggest.

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Toward a Solution . . .

PROBLEMS created by the recent introduction and wide application of organic pesticides are now under intensive and continuing study by the Liaison Committee on Organic Pesticides, organized by A.I.F.A.

Distinguished representatives of Government, the Food Industry, Growers and the Medical Profession have accepted invitations to serve on this committee, in the belief that all pesticides have an important role to play in advancing agricultural efficiency, increasing food production and bettering public health.



Agricultural Insecticide & Fungicide Association

285 Madison Ave.

New York 17, N. Y.

OFFICERS

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A. W. MOHR, Vice-President

LEA S. HITCHNER, Executive Secretary and Treasurer

Suppliers' Bulletins

Day Sifter Catalog

J. H. Day Company, Cincinnati, Ohio, has issued a new catalog describing its line of "Ro-Ball" gyrating screens for industrial use. The equipment has application wherever precision separations are necessary, the bulletin states, since the machines permit the use of screen cloth having mesh openings approximating more closely the size of the desired product.

Illustrations of various models of sifters are presented in the catalog, with sectional drawings to picture the mechanical construction of the machines. A list of uses for Day equipment includes application in fertilizer, Fuller's earth, gypsum, crushed rock, insecticides, limestone, sulfur and feed.

Also described in the catalog are cabinet blenders, sifters with dump-hoppers and portable equipment.

The catalog, designated as bulletin #377, is available from J. H. Day Company, Cincinnati 22, Ohio.

New St. Regis Bag Offered

St. Regis Paper Co., New York, has announced the successful development of a flat tube sewn valve multiwall paper bag, particularly adaptable for use in fertilizer packaging. Features of the new bag include economy, a lack of sifting and easier handling of filled bags. The new bag is made without a gusset in the valve, the company states, and experiments have indicated satisfactory performance.

Peach Pest Information

Oregon State College, Corvallis, has issued a recent bulletin recommending "Phygon" as the early fall spray for peach blight and dieback. The bulletin gives information for control not only of peach diseases, but of insect pests as well. A chart showing successive sprays through the season is included in the circular

which may be obtained from the Oregon Agricultural Experiment Station.

APFC Offers 2nd Edition

The American Plant Food Council, Washington, D. C. has announced that individual copies of the second edition of "Our Land and its Care" may be obtained from the Council's offices, 910 17th St., N. W. The booklet, well illustrated throughout its 64 pages, was prepared in collaboration with the staff of the Agricultural Education Service of the U. S. Office of Education. The second edition was issued after demands of county agents, vocational agricultural teachers and others in the agricultural field exhausted the first printing of 400,000 copies.

New Mixer Announced

American Machine & Foundry Co., New York, has produced a continuous automatic mixer which features accurate and reliable mechanical controls to take guesswork out of mixing various batches. The principle of mixing is described as being entirely new, to yield greater uniformity and more stable mix, and to effect economies in space required and in power consumed. Literature is available from the company's offices, 485 Fifth Ave., New York 17, N. Y.

Calif. Offers Booklets

California Agricultural Experiment Station and Extension Service, University of Calif., Berkeley, has published a catalog of its agricultural publications. Included are a number on pest control. These are: No. X87, "Insects and Other Pests Attacking Agricultural Crops;" X138, "Control of Field Rodents in California;" X142, "Control of Rats and Mice;" C330 "Root-Knot Nematode;" C346, "Thrips of Economic Importance in California;" C365, "Investigations with DDT and Other

New Insecticides in 1945;" L62, "Use of Two New Soil Fumigants, 'D-D' and 'EDBI, for Wireworm Control in California;" B666, "Spraying Equipment for Pest Control;" B676, "Insects Affecting Stored Food Products;" B681, "Control of Diabrotica, or Western Spotted Cucumber Beetle, in Deciduous Fruit Orchards;" and M5, "Organic Phosphate Insecticides."

Under the subject of weed control, the following pamphlets are offered: X133, "2,4-D as a Weed Killer;" X137, "General Contact Weed Killers;" 127, "Toxicity of Herbicides to Livestock;" B615, "Chemical Control of St. Johnswort;" B637, "Alien Plants Growing Without Cultivation in California;" B648, "Plot Tests with Chemical Soil Sterilants in California;" and B693, "Herbicidal use of Carbon Disulfide."

The Station points out that out-of-state residents may order one copy each of as many as ten publications.

U.S.I. Booklet on Aerosols

U.S. Industrial Chemicals, Inc. offers a booklet, "Low Pressure Aerosols," by Russell G. Stoddard. The folder, reprinted from *Soap & Sanitary Chemicals* discusses the aerosol subject from the standpoints of mechanical performance, insecticidal effectiveness, toxicity, objectionable characteristics, sales promotion and price. Available from the company, 60 E. 42nd St., New York 17 N. Y.

New Powell Bulletin

A new technical bulletin on benzene hexachloride has been issued by John Powell & Co., Inc., New York. Information in the bulletin is based on latest experimental and actual field usage of BHC in the control of cotton insects, livestock parasites, grasshoppers, and poultry insects. In addition to chemical and physical data, toxicity, method of action, effectiveness against various insects, etc., the new bulletin gives directions for use and full labeling instructions. Copies are available from the company, One Park Ave.



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INDUSTRY NEWS

Honored by Army-Navy

Dr. P. N. Annand Chief of the Bureau of Entomology and Plant Quarantine, was recently presented



DR. P. N. ANNAND

a Citation for National Defense, signed by Secretary of War Robert P. Patterson and Navy Secretary James Forrestal. The Citation reads: "The War Department and the Navy Department express to Percy N. Annand their appreciation for an outstanding contribution to the work of the Office of Scientific Research and Development during World War II."

During the war years, Dr. Annand provided leadership and direction in the development of new insect control methods which the armed forces used to advantage. Entomologists of the bureau and other scientists helped to introduce areosols, and numerous organic insecticides which contributed to the war effort.

Richfield Enters Ag Field

Richfield Oil Corporation, Richfield Bldg., Los Angeles 13, Calif., has announced its entry into the agricultural chemical field. Three herbicidal oils, "Richfield Weedkiller 'A,'" a non-selective highly aromatic emulsifiable petroleum weedkiller; "Richfield Selective Weedkiller #1," for weeding carrots and

related crops; and "Richfield Selective Weedkiller #2" for weeding flax are the products being placed on the market. A. H. Bronson is manager of the speciality product sales department which handles distribution of these products.

Mechanization Conference

The second annual Beltwide Cotton Mechanization Conference was held at Lubbock, Texas, October 14-16. The event was sponsored by the National Cotton Council of America. It attracted some 500 delegates. Speakers included representatives of government, industry, cotton belt land grant colleges, and the extension services. The need for complete mechanization of cotton was stressed by the conference. Speakers included Chester Davis, president, Federal Reserve Bank, St. Louis; Frank Ahlgren, editor, *Memphis Commercial Appeal*; and Dr. M. V. Bailey, American Cyanamid Co., New York.

Meetings

Ohio Pesticide Institute, Dec. 1 & 2, Columbus, Ohio.
82nd Annual Kansas State Horticultural Society Meeting, December 2 & 3, Kansas City, Kan.
American Phytopathological Society, December 6, 7 & 8, Wm. Penn Hotel, Pittsburgh, Pa.
National Association of Insecticide and Disinfectant Manufacturers, Dec. 6 & 7, Hotel New Yorker, New York.
North Central Weed Control Conference, December 8, 9 and 10, Abraham Lincoln Hotel, Springfield, Illinois.
Amer. Ass'n. Economic Entomologists, New Yorker Hotel, New York, December 13-16, 1948.
Northeastern Weed Control Conference, Jan. 5-7, New Yorker Hotel, New York.
National Cannery Association (and Canning Machinery and Suppliers Association) January 14-21, Atlantic City, N.J.
Western Weed Control Conference, February 3 & 4, Bozeman, Montana.
South Dakota State Weed & Livestock Pest Control Conference, March 15 & 16, Aberdeen, S. Dakota.

Miller to Pennsalt Labs.

Pennsylvania Salt Mfg. Co. has announced the appointment of Dr. Harold J. Miller as Senior Plant



DR. HAROLD J. MILLER

Pathologist at the company's White-marsh Research Laboratories near Philadelphia. Dr. Miller was formerly Assistant Professor of Plant Pathology at Pennsylvania State College. He is a native of Rudolph, Ohio, and was graduated from Ohio State University in 1933. Four years later he joined the faculty of Penn State College. While there he completed his work for his doctorate which he received in 1942.

The new appointee is a member of the American Association for the Advancement of Science, the American Phytopathological Society, Franklin Institute, Phi Beta Kappa and other societies.

Ohio Pesticide Meeting

The Ohio Pesticide Institute has announced its annual meeting to be held at Columbus, Ohio, December 1 and 2. Headquarters for the event will be the Fort Hayes Hotel, according to H. C. Young, secretary of the Institute. Mr. Young states that half-day panel discussions of fungicides, insecticides, herbicides and rodenticides will be featured on the program.

New Directors of Agricultural Insecticide and Fungicide Ass'n.



T. H. McCORMACK

T. H. McCormack is a native of LaSalle, Illinois. He entered the University of Illinois just before World War I, but left it to serve in the U. S. Army. He became a fighter pilot and saw action in France during the latter part of the war. Upon returning home, he re-entered the University to graduate in 1920.

He became associated with Grasselli Chemical Co. at East Chicago as a laboratory chemist, and later worked through various phases of the operations in E. Chicago. In 1934 he became plant manager of the Cleveland plant, and six years later was made plant manager of the Grasselli, N. J. plant.

In 1942 he was transferred to Wilmington as Assistant Director of Sales. The next year he was made Director of Sales of the Grasselli Chemicals Department, which position he now holds.



D. S. GAARDER

Donald S. Gaarder is director of the Sherwin-Williams Agricultural Chemicals Division and as such, heads the company's activities in the field of insecticides, fungicides and herbicides.

He is a native of Orfordville, Wisconsin, and a graduate of St. Olaf's college with the class of 1934. He took additional work at the University of Wisconsin, and in 1936 made a connection with Sherwin-Williams as a chemist in the Technical Service Department at the Chicago plant.

Mr. Gaarder was later transferred to production, and in 1943, moved to Cleveland, Ohio, as assistant superintendent of production for S-W. In 1945, he organized the company's planning department for coordinating sales and manufacturing functions and headed that activity until the Agricultural Chemicals Division was formed late in 1947.



R. B. STODDARD

Russell B. Stoddard is a native of Massachusetts, having been born in North Brookfield. He spent his early life in New England, and was educated at Clark University, Worcester, Mass., from which he was graduated.

Mr. Stoddard's career in the industry began in 1934 at which time he joined R. J. Prentis & Co., Inc., New York. He later became connected with Dodge & Olcott, Inc., New York, and was made manager of the insecticide division of that company in 1939.

In 1945, the company was purchased by United States Industrial Chemicals, Inc. Mr. Stoddard continued his usual work in the insecticide division until January 1, 1948, at which time he was made coordinator of insecticide operations by U. S. Industrial Chemicals. He has continued in this position since that time.

Va.-Carolina Chemical Holds Open House

SEVERAL thousand persons went through the new home of Virginia-Carolina Chemical Corporation in Richmond, Va., during the company's "open house" held on October 15. Officers of the company were on hand to greet all visitors and to help display the new quarters, while V-C employees were stationed at various spots on the three floors to answer questions and act as hosts and hostesses.

V-C president A. Lynn Ivey and executive vice-president Joseph A. Howell received hundreds of guests in their offices, and other officials were also kept busy greeting throngs of well-wishers. These officers included vice-presidents Edward

Ryland, Edwin Cox, Charles E. Heirichs, and Irving D. Dawes, vice-president and treasurer; George G. Osborne, secretary; Curtis B. Alderman, assistant secretary, Leslie W. Dunn, assistant treasurer, and E. E. Franck, auditor.

The new building itself is of ultra-modern functional design, built of red brick trimmed with white limestone. Interior lighting is by recessed fluorescent fixtures, and the entire building is air conditioned.

Virginia-Carolina Chemical Company was established in 1895 when seven fertilizer companies in Virginia and one in North Carolina combined the capacities of their various plants under one management.

The company continued to expand, including eventually, fertilizer manufacturing facilities in 14 states, phosphate rock mines in S. Carolina, Tennessee and Florida; cottonseed crushing facilities in nine southern states (later sold); pyrites and sulfur mines in Virginia and Mexico (later abandoned), and potash mines in Germany (sold after World War I). Highlighting this period was the company's pioneering in production of concentrated superphosphate. Its plant at Charleston, S. C., established in 1907, was the first in the United States.

The company was reorganized in 1925, and the present corporation was founded. Consistent growth since then has brought V-C to its present position in the chemical industry.

California Fertilizer Ass'n Elects E. R. Mog

THE California Fertilizer Association elected as its president, Earl R. Mog, Growers Fertilizer Co., Stockton, Calif. at its 25th annual conference held at the Mission Inn, Riverside, California, October 18 and 19. Mr. Mog succeeds Wallace MacFarlane, Pacific Guano Co., Berkeley, Calif. The new vice-president is J. M. Quinn, California Sun Fertilizer Co., Los Angeles, succeeding Mr. Mog.

Paul Pauly, Pacific Guano Co., Los Angeles, remains as secretary; Grover C. Dunford, Inland Fertilizer Co., Los Angeles, treasurer; and Oliver E. Overseth continues as executive secretary and manager.

Monday morning's session featured reports of the work done by the California Bureau of Chemistry. Allen B. Lemmon, chief of the bureau, presented his annual report, and Dr. W. E. Martin, Berkeley, told of 1947 tests with nitrogen and phosphorus on grain in California. He pointed out the extreme importance of water in releasing these nutrients to the plants.

A report on the use of radioactive phosphorus as a tool in plant nutrition research was presented by Dr. E. F. Wallihan, Riverside; and Dr. Oscar A. Lorenz, Davis, discussed various means of fertilizer placement in a preliminary report.

In his address of welcome, Dr. L. D. Batchelor, director of the Citrus Experiment Station, Riverside, discussed the serious situation concerning the virus disease, "Quick Decline" and the need for further research to find a remedy for the disease. Dr. MacFarlane related some of his experiences during his twenty-five years in agriculture in California, comparing prices and acreages in the past and present. F. R. Wilcox, California Fruit Growers Exchange, stated in his talk that the citrus industry is now apparently stabilized at some 300,000 acres of citrus groves in the state; and Dr. Hans Jenny, professor of Soil Chemistry, University of California, pointed out that as soils grow older, the need increases for careful application of fertilizer materials.

Dr. A. D. Shamel, Riverside, opened the afternoon session with a back-look over a half century of fertilizer practices, comparing methods of fifty years ago with those of today. C. T. Prinderville, Swift & Co., Chicago, analyzed the functions of a trade association as being valuable from standpoints of sales promotion, public relations, and government relations. M. E. McCollam, American Potash Institute, in reporting on the activities of the Association's soil improvement committee, explained that the committee was working with the University staff at both Riverside and Davis, to gain information on fertilizer placement and factors affecting phosphorus uptake by citrus. Radioactive phosphorus is being used as an experimental tool at Riverside, he said.

Dr. George D. Scarseth, American Farm Research Association, LaFayette, Indiana, pointed out to the group that to assure continuing productivity of soil, as much or more nutrient material must be added to the soil each year to replace that which is used by the harvested crop.

A similar note was sounded by Dr. Oliver E. Overseth, who thanked C.F.A. members for their cooperation and stressed the need for everyone in the association to work toward a sound and improved California agriculture.

Eastern Branch Meeting Set

Numerous papers on insecticide experiments for 1948 were to be included on the program of the Eastern Branch of the American Association of Economic Entomologists scheduled to be held November 18 & 19 at the New Yorker Hotel, New York. Although the program had not been completed at press time, Dr. Byrley F. Driggers, New Brunswick, N. J., secretary-treasurer of the branch, stated that most of the paper titles had been submitted.

These included "The Effect of Wetting and Spreading Agents on the Toxicity of DDT Spray Powders," by Nancy Woodruff and Neely Turner, New Haven, Conn.;

"A Preliminary Report on Aerosol Cattle Spray," by William F. Barthel, Elkton, Md.; "Sprays for Control of the Peach Tree Borer," by M. L. Bobb, Charlottesville, Va.; "Control of the Plum Curculio, the Oriental Fruit Moth and Cat-Facing on Peaches," by Castillo Graham, Hancock, Md.; "Armyworm Control on Forage and Truck Crops," by Richard N. Hofmaster and Douglas E. Greenwood, Norfolk, Va.; "Some Experiments on the Control of the Garden Centipede," by Clyde C. Hamilton, New Brunswick, N. J.

Nobel Prize for DDT

The discovery of insecticidal use of dichlorodiphenyltrichloroethane in 1939, has brought to Dr. Paul Mueller, Geigy Drug Industries, Basle, Switzerland, the 1948 Nobel Prize in medicine. The award will be made at a ceremony in Stockholm, Sweden, on December 10. Its worth, financially, is about \$44,000 (159,772 crowns).

Dr. Mueller, 48 years of age, has been with the Geigy laboratory for some 23 years, having joined the company at the age of 23 as assistant in charge of work on synthetic tanning substances. He visited the United States three years ago, with a number of other Swiss scientists, at the invitation of the U. S. Government.

The Nobel winner is a native of Ofen, Switzerland, a town located between Basle and Luzerne. He studied at the University of Basle from which he received his Doctorate in 1925.

Dr. Collins Dies

Dr. C. Walter Collins, retired entomologist, died October 18 at Morristown, N. J. He was 66. Dr. Collins retired in 1944 as senior entomologist in charge of the U.S.D.A. Forest Insect Laboratory at Morristown. He had entered the U.S.D.A. service in 1907 as an assistant in the Gypsy moth laboratory. From 1928 to 1935 he was in charge of the gypsy and browntail moth investigations in New England, and later, at the Morristown laboratory, he directed the investigation of insect carriers of Dutch elm disease fungus.

Full Program Planned by Phytopath Group

THE three-day program of the American Phytopathological Society's fortieth annual meeting to be held at the Wm. Penn Hotel, Pittsburgh, Pa., December 6, 7 and 8, was nearing completion as this issue went to press. The meeting will open Monday morning with a business session, and in the afternoon three sessions will run concurrently. These include a discussion on diseases of peach and of apple; another on diseases of oats,

barley and wheat; and a third on tomato diseases. An evening meeting is scheduled for Monday, with a symposium on the teaching of plant pathology.

Three concurrent sessions are scheduled for Tuesday morning, also. Beginning at 9 a. m., one session will cover the subject of fungicides, with Dr. J. W. Heuberger, College Park, Md., as chairman. Papers to be presented include discussions of applica-

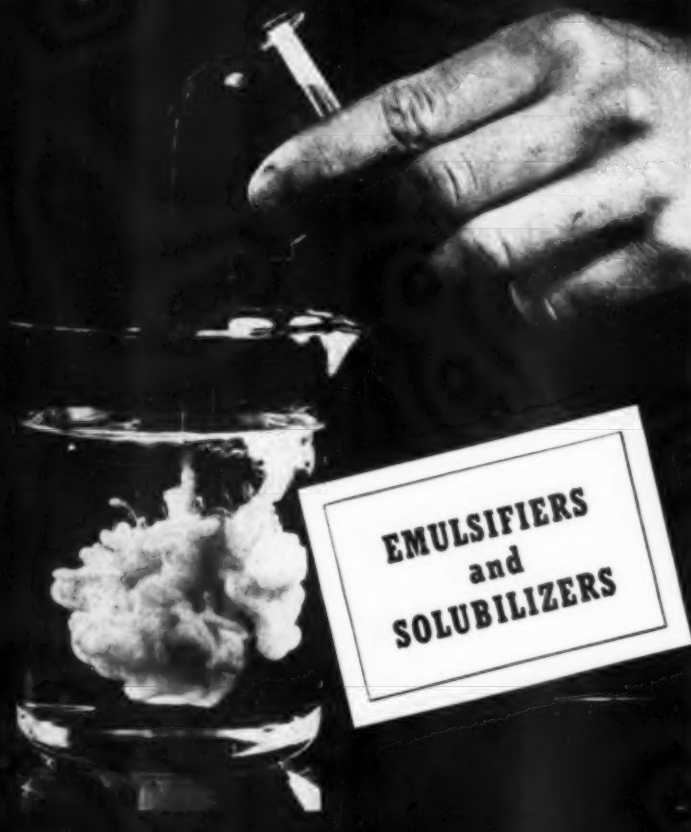
tion equipment, fungicides for seed treatment, and comparisons of soil fungicides. At the same time, sessions will be held on diseases of vegetable and field crops.

Tuesday afternoon's program will likewise consist of three concurrent sessions. These will include a report on results of regional testing of sprays and dusts; discussion on diseases of fruit crops; and papers covering diseases of tobacco and miscellaneous crops. The annual dinner will be held at 6 p. m. Tuesday, and in the evening, beginning at 8 o'clock, three concurrent sessions will be held.


A session on forest tree diseases will feature the morning program of Wednesday, and another trio of concurrent meetings will be held in the afternoon. These will include a joint meeting with the Potato Association of America; a session on Virology; and the fungicide colloquium. The latter will feature a series of papers by representatives of fungicide manufacturers, and makers of diluents and adjuvants who wish to present to the group any such product which falls into one or more of these categories: new fungicides which will be available for testing in 1949; new fungicides now commercially available, or to be marketed in 1949; improvements made in older fungicides, or new uses for them; and new fungicides developed for use in seed treatment. Each industry speaker will be limited to five minutes, and it was suggested by the committee that each company should supply mimeographed data. Only those will be called upon to speak who have had full clearance by their companies, and will have requested a place on the colloquium program.

Any company manufacturing fungicidal materials, diluents or adjuvants is eligible to apply for a place on the fungicide colloquium.

The AIF Association has been asked to assist in handling such requests, so correspondence may be addressed to the Agricultural Insecticide and Fungicide Association, 285 Madison Ave., New York 17, N. Y. Applications will be accepted up to a few days before the meeting, but the committee should like to have all names as soon as possible.



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Interesting Program for N. Central Weed Meet

DISCUSSIONS of all phases of chemical weed control are planned for the North Central Weed Control Conference to be held at the Abraham Lincoln Hotel, Springfield, Illinois, December 8, 9 and 10. Dr. C. J. Willard, Ohio State University, president of the Conference, stated just before press time that the program was well under way, and that a record attendance is expected.

The opening day will include a general program with president Willard in charge. Discussion will include a report of coordinated research in 1948, by L. M. Stahler; Pre-emergence Treatments on Corn, by R. F. Fuelleman; and Pre-emergence Treatments on Other Crops, by K. P. Buchholtz.

Wednesday afternoon's session will be divided into three sectional meetings, as follows: Field

crops, H. E. Wood, chairman; Horticultural crops, B. H. Grigsby, chairman; Non-tillable land, L. W. Melander, chairman. Exhibits of equipment and conferences will be in charge of C. H. Keltner, K. C. Barrons and L. V. Sherwood.

The evening session will feature a session on sugar beets, peas, potatoes and other specialized crops, with E. A. Helgeson, chairman. Other special meetings were to be arranged by the chairman.

Thursday morning's general meeting will be under the chairmanship of T. F. Yost. Perennial and annual weeds will be discussed by A. H. Larson and George Knowles. Educational and action programs will be described by W. K. Klatt and E. P. Sylvester. The afternoon session will include discussions of machinery and methods of application, and new

herbicides. A business meeting will complete the afternoon's schedule. The annual dinner will be held Thursday evening.

Friday morning's activities will be divided into three sections: Physiology and Basic Studies, under George McNew, chairman; Educational Problems in Weed Control, Dr. Sylvester, chairman; Regulatory Problems in Weed Control, W. L. Klatt, chairman. The Conference will end on Friday afternoon.

Post Leaves Gallowhur

Stephen J. Post has announced his resignation as sales manager of Gallowhur Chemical Co., New York, manufacturers of agricultural and industrial chemicals. Mr. Post was instrumental in the marketing of Gallowhur's products "Puratized," "Pura-Turf," and other fungicides and herbicides to the trade during the past number of years. At press time, Mr. Post had not announced his plans for the future.



VIRGINIA-CAROLINA CHEMICAL CORPORATION Home Office: Richmond, Va.

Lion Plans Construction

Lion Oil Co., El Dorado, Arkansas, has signed contracts for construction of a new sulfuric acid plant and an ammonium sulfate plant near its present chemical works at El Dorado. Cost of the two projects is to be about \$2,000,000. Actual construction was to begin this fall. The company points out that these projects are in addition to the \$3,500,000 expansion to the anhydrous ammonia facilities already under way.

The larger of the two new plants will be the one for manufacture of sulfuric acid, which will be of the "contact" type. It is expected to produce about 300 tons per day. Equipment will consist of a furnace, reactor towers, air blowers, acid pumps, storage tanks, a pit for melting sulfur and storage facilities for the sulfur and for 2,000 tons of sulfuric acid. Vanadium catalyst will be used in the operation. This plant is estimated to cost \$1,250,000.

The ammonium sulfate plant

will consume 288 tons per day of sulfuric acid and 100 tons per day of ammonia to produce a total of 380 tons per day of commercial grade ammonium sulfate. In this plant, the principal equipment will include contactors, centrifuges, driers, conveyors and bulk storage for 4,000 tons of ammonium sulfate. The complete sulfate plant is estimated at \$750,000.

Designing for the new plants was three-quarters completed on each project on October 6, the company announced, and procurement was over half done. Actual construction of foundations was scheduled to begin early this month. It is hoped to have both plants completed by September, 1949.

Establishes Own Business

Thomas A Farrell, for the past few years special sales representative for American Chemical Paint Co., Ambler, Pa., has announced his entry into the agricultural chemical field as an independent formulator and operator. His office is at 30 West Washington St., Chicago 2, Illinois.

Mr. Farrell is introducing a special herbicide, "Tafco-Penta" for control of Johnson grass and other hard-to-kill weeds. In addition, he will market a complete line of 2,4-D products, among which is an improved iso-ester with activator. A complete line of power sprayers will also be featured, with models for numerous purposes in the field of agriculture.

Well-known in the seed, floral and implement trades, Mr. Farrell has recently concluded a number of research tests with his new product for control of Johnson grass, and before that had studied weed control projects in the rice, grain and grass areas of Louisiana, California and other southwestern states.

Campbell in New Post

American Cyanamid Co., New York, has announced the appointment of Arthur J. Campbell as Division Manager of the Industrial Chemicals Division. He was formerly General Sales Manager of the division.

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AGRICULTURAL CHEMICALS

New Chemicals Subject at Chicago Meeting

USE of radio active materials by agricultural chemists to study plant growth should add considerably to the efficiency of farm production, Dr. L. B. Howard, former head of the U.S.D.A.'s Bureau of Agricultural and Industrial Chemistry, predicted in an address at the National Chemical Conference, held in conjunction with the 5th National Chemical Exposition in Chicago, October 14. In discussing "Chemistry in Agriculture," Dr. Howard declared that the farmer's use of synthetic fertilizers, particularly phosphates, would be most benefitted through studies being made with radioactive tracers. Last year farmers used nearly 6 million tons of phosphate, he said, but he questioned the need for it all.

"Under present farm conditions," he said, "crops may use more than 60 per cent of the nitrogen and potash in fertilizers, but they rarely take up as much as 20 per cent of the phosphorus."

He referred to the growing trend toward use of liquid fertilizers, of which, he said, an outstanding new material of this type is liquid anhydrous ammonia. This, he said, is the least expensive nitrogen fertilizer, costing at present about one-third as much as solid ammonium nitrate.

Insecticides Lauded

INSECTICIDES, Dr. Howard pointed out, are another important group of chemical aids to farming. He spoke of the rapid progress in discovery of organic compounds, particularly the chlorinated hydrocarbons and some organic phosphorus compounds with outstanding insecticidal properties.

Among newcomers in the insecticidal field he discussed DDT and its analogs, benzene hexachloride, chlordane and chlorinated camphene. The phenomenal popularity of DDT, he went on, "is a tribute to chemistry and entomology, and also gives clear evidence that mankind's battle against the bugs is far from finished . . . only recently, the Bureau of Entomology and Plant Quarantine confirmed the suspicion that house flies in many parts of the country are developing resistance to DDT."

"We still know very little about the newer insecticides," said Dr. Howard, "and so far the Bureau of Entomology and Plant Quarantine has not made general recommendations for their use, except in a few instances for DDT. The main problem with DDT is still the possible harmful effects to men and animals of residues remaining on food and forage crops. The other new materials may also present danger, unless they are properly used. Chlorinated hydrocarbons are very stable and they may accumulate in the soil over a period of years."

Regarding use of 2,4-D as an herbicide, Dr. Howard asserted that "Because of this chemical more progress has been made in weed control during the past five years than in the entire history of agriculture."

Continuing, Dr. Howard outlined the work of the various regional laboratories in applying chemical research results to the discovery of new uses and wider markets for farm commodities.

"Our increased agricultural efficiency," he summed up, "is, of course, due to many factors . . . But certainly chemistry has made important contributions—on the farm, in laboratories and in factories—to the increased production and more effective utilization of farm products."

More than 40,000 persons visited the National Chemical Exposition during its five-day run in the Chicago Coliseum. Over 200 commercial exhibitors displayed their newest contributions to industrial progress through chemistry.

Florida Soil Meeting

The ninth annual meeting of the Soil Science Society of Florida met October 12 and 13 at Clewiston, Fla. to discuss control of water plants. On the program to discuss chemical

control of aquatic weeds, was Hoyt A. Nation, Dow Chemical Co., Auburn, Ala., who reviewed formulations used; C. S. Harris, Shell Oil Co., New York, who led a discussion on the subject; John W. Randolph, Everglades Experiment Station, Belle Glade, Fla., who described ground and water-borne spray equipment; and A. E. Holland, Sherwin-Williams Co., Bhattow, Fla., who spoke on airborne methods of application.

Results of such work under Louisiana conditions was discussed by Dr. F. W. Zur Burg, Southwestern Louisiana Institute, LaFayette, La.; and a review of weed control under Florida conditions was presented by Charles C. Seale, Everglades Experiment Station, Belle Glade, and L. S. Evans of the U.S.D.A., Washington, D. C.

Plans Huge N Plant

Formal organization of the Mississippi Chemical Corporation was to take place on October 27 in Jackson, Mississippi, according to Owen Cooper, committee chairman. The new corporation expects to go ahead with plans for the construction of a \$12,000,000 nitrogen fertilizer plant in Mississippi. The committee had sold over 3 million dollars worth of stock ten days before the date for formal organization. All stock was being sold to prospective fertilizer users in the State, Mr. Owen said.

Weed Control Boom

Automatic Equipment Mfg. Co., Pender, Nebr., has announced to farm equipment dealers the availability of a new boom drop for its automatic all-purpose sprayer, which, it is claimed adds to efficiency in weed control. The boom, as described in company literature, permits the spraying of herbicides below the leaves of row crops where it is most effective on weeds. An even flow is said to improve results. The company's automatic sprayer is traction-powered, adjustable, and stays in position to make it easy to follow contours and to turn at row ends without damage to crops. A tricycle tank unit holds 150 to 300 gallons, sufficient to spray 60 to 120 acres.

Oil Chemists Meet

The fall convention of the American Oil Chemists' Society was scheduled to be held at the Pennsylvania Hotel, New York, November 15-18. The advance program indicated that Philip H. Groggins, chemical engineer of the Bureau of Agricultural and Industrial Chemistry, U.S.D.A. would talk on the work being done in the U.S.D.A. Regional Research Laboratories. Other topics were to include the nutritional aspects of glyceridic and edible oils and analyses of various types of oils.

N.P.C.A. Elects Montgomery

V. H. Montgomery, San Francisco, Calif., was elected president of the National Pest Control Association at its annual meeting held October 18-20 at the Royal York Hotel, Toronto, Ont., Canada. Mr. Montgomery succeeds George L. Hockenjos as president. Regional vice-presidents for the ensuing year were chosen as follows: I. B. Carncross, Syracuse, N. Y.; H. E. Jennings,

Chicago; W. Q. Phippard, Cincinnati; R. B. Mesecer, Burbank, Calif.; C. A. Trimbos, Dallas, Texas; and H. L. Felton, Atlanta, Ga. Re-elected secretary-treasurer, was Robert C. Yeager, Cincinnati; and William O. Buettner, Brooklyn, N. Y., was named executive secty. to succeed himself.

Included on the speaking program were Drs. F. C. Bishopp, James C. Munch, Bruce H. Douglas and Prof. J. J. Davis, Purdue University.

NAIDM Meets in December

The 35th annual meeting of the National Association of Insecticide and Disinfectant Manufacturers will be held at the Hotel New Yorker, New York, on December 6 and 7, it has been announced. In charge of the program is T. Carter Parkinson, McCormick & Co., Baltimore, chairman of the committee composed of James E. Ferris, Niagara Alkali Co.; Melvin Goldberg, Geigy Co.; and John Powell, John Powell & Co., all of New York; and John Marcuse, West Disinfecting Co., Long Island

City, N. Y. In charge of arrangements is Ira P. MacNair, MacNair-Dorland Co. New York. John H. Calo of John H. Calo Co. and L. J. LaCava of Continental Can Co., New York, are in charge of entertainment.

New Address for Chemco

Chemco Products Company, Inc. has announced that its general offices and plant are now located at 7740 West 47th St., Lyons, Illinois. The Chicago telephone number is ROckwell 2-3166, and the Lyons telephone is 6740.

N. C. Bulletin in Color

North Carolina Agricultural Experiment Station, Raleigh, has recently issued Bulletin No. 362. "Dusting Cucumbers to Control Downy Mildew." A number of full color plates illustrate the manner in which the disease affects leaves, and shows the difference between plots dusted with tribasic copper sulfate and check plots where no dusting was done.

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TABLE I (Continued from Page 31)

Nova Scotia	Dusts used only in small gardens	Most general	all	0	Excellent
	Bordeaux spray 4-3-40	—	all	0	Excellent
Ohio	Fixed Copper spray				
	Dust—Copper or "Zerlate" or mixed schedule	Most of affected acreage	most		Dry weather checked disease
	Bordeaux spray	5			
Pennsylvania	Fixed copper spray or dust				Used in home gardens
	Sprays—"Zerlate" 2 lbs. per 100 in 2 to 3 sprays + Copper (2 lb. metallic Cu as fixed Cu per 100 or 6-3-100 Bordo)	85	all	0	Good
	"Dithane D14" + zinc sulfate } 2 qts.—1 lb. or "Parzate" 2 lbs. }	10	all	0	Nearly as good as "Zerlate"-Copper when often enough
	Dusts—"Zerlate" + copper	5	5	95	Medium
South Carolina	Fixed Copper dust, practically no spraying, 6% Cu	15	90	10	Fair to good
Tennessee	Fixed Copper dust, 7% Cu	10	Hand machined	0	Poor—possibly application
	Bordeaux spray 8-8-100	Few	"	0	Poor—possibly application
	"Dithane D14"—zinc—lime, 2 qts.—1½-100	Few	"	0	Poor—possibly application
Virginia	Fixed Copper dust, 5% Cu	15	all	0	Satisfactory if properly used but poor in general. Frequent applications necessary
	Bordeaux spray, 4-4-100	Trace	all		Very good
	Fixed copper spray, 1 lb./100	Trace	all		Very good
	"Dithane Z78" spray	Trace	all		Very good
	"Parzate" spray	Trace	all		Very good
West Virginia	Dusts—				
	Yellow copper oxide, 4.8% Cu	25	all	0	Fair
	Tribasic copper sulfate, 7% Cu	40	all	0	Good
	Copper-lime, 20% Cu-80% lime	10	all	0	Fair
	Sprays—	50	all	0	Good
	Tribasic copper sulfate, 53% Cu (4 lb./100 gal.)	50	all	0	Good
	Bordeaux 4-4-50	50	all	0	Good
Wisconsin	Tribasic Copper, 4 lb.	5	all	0	
	Bordeaux 8-12 + 8-12 + 100	40	all	0	

TABLE II

Control of late blight on potato: materials used in 1948

State or Province	Material and Formula	Percent growers using	Percent applied by		Results and Remarks
			Ground machine	Airplane	
Delaware	Fixed Copper dust (Copper A; Tribasic) 5-7% Cu	25	15	10	Fair
	"Dithane Z-78" dust, 6%	20	10	10	Fair
	"Dithane D-14" + zinc sulfate spray, 2 qts.-1-100	20	20		Good
	"Dithane Z-78" spray, 2-100				
	"Parzate" spray, 2-100				
Florida Belle Glade	"Dithane Z-78" dust, 10%	80% acreage	0	all	Blight did not have appreciable effect on yield
	"Copper A" dust, 7% Cu	10% acreage	0	all	
Ft. Myers	Copper-lime dusts, 20-80	2	75	25	Poor
	"Copper A" dust	2	75	25	Poor
	Other dusts	1	all	0	Poor
	"Dithane D-14" + ZnSO ₄ + lime spray 2-1½-100	90	all	0	Good
	Bordeaux, 4-4-50 + sticker	5	all	0	Fair
Dade County	"Dithane"-zinc sulfate 2-1-100	95	all	0	Good
	Bordeaux spray	Few			Not Good
	Fixed copper	Few			Not Good

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Agricultural Chemicals

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New York 1, N. Y.

Louisiana	"COCS", dust 12%	5	all	0	Good
	"Dithane Z-78" dust 6% + DDT	15	all	0	Good
	Bordeaux spray 4-4-50	10	all	0	Good
	"Dithane D-14" + zinc sulfate + lime spray 1½-1½-100	20	all	0	Good
Manitoba	Bordeaux spray	—	—	—	
Maryland	Bordeaux spray 8-8-100	30% acreage			Good
	Fixed copper spray 4-100	5% acreage			Good
	Fixed copper dust 5-7% (largely by plane on lower eastern shore)	20%			Fair to Good
	"Dithane Z-78"	trace			Good
Massachusetts	Copper dusts (various), 6-7% Cu	5+	most	Trace	Poor to fair
	Bordeaux spray, 10-5-100	40	all	0	Good
	Neutral Copper sprays, 6-7% Cu	15	all	0	Fair to Good
	"Dithane D-14," 2-3 qt.-100	20	all	0	Fair to Good
Minnesota	Copper dusts	85	most	5	Fair
	Carbamate dusts	5	all	0	
	Copper sprays	5	all	0	Good
	Carbamate sprays	5	all	0	Good
New Brunswick	Sprays—	75% growers	all	0	
	Bordeaux spray, 4-2-40, or 4-4- 40	50% acreage			Has given best results
	Fixed Copper sprays	Most of rest of sprayed acreage			
	"Dithane" spray	small acreage			
	Dusts	25% growers	all	0	
New Hampshire	Ready mixed Copper basic sul- fate	Practi- cally all of dusted acreage			
	Neutral Copper dusts, 5-7% Cu	50	all	0	Good
	Bordeaux spray or neutral cop- pers, 10-5-100, 26% Cu, 6-8- 100	50	all	0	Good
New Jersey	Copper spray, 4 lbs./100 gal. of a 50% Cu	35	all	none	Very Good
	Organic Sprays, various	5	all	none	Good
New York Long Island	Sprays—Bordeaux, copper oxy- chloride sulfate, tribasic cop- per sulfate, Dithane Dusts—Coppers as with sprays				Disease never serious in properly treated fields
North Dakota Red River Valley	Copper dusts	85	90	10	Questionable
	"Dithane D-14" spray	15	all	0	
Nova Scotia	Dusts				Used only in small gardens
	Basicop spray, mfr.	40	all	0	Good when regularly applied
	Bordeaux spray, 4-2-40	30	all	0	
	Other fixed Coppers	30	all	0	
	"Dithane"	slight	all		
Ohio	Bordeaux Spray	Most general- ly used in com- mercial			Good
	Fixed copper spray or "Dithane" spray	Gradual- ly in- creasing			Good
	"Zerlate"	some			Not Good
	"Parzate"	some			Good
	Dusting mostly small gardens				

Ontario	Fixed Copper dusts	50	all	none	} Good where properly applied
	Bordeaux spray, 10-10-100, 10-5-100	50	all	none	
Pennsylvania	Bordeaux spray, 8-4-100	50	all	0	Very fine
	Fixed Copper spray, 2 lbs. metallic Cu per 100 gal.	25	all	0	Very Good
	"Dithane D14" + ZnSO ₄ , 2 qts.-1 lb.	20	all	0	Good. If period between applications becomes too long, control decreases
	"Parzate," 2 lbs.-100 gal. Very little dusting	5	all	0	Not so good as sprays
Quebec	Dusts—"COCS"	1	all	0	Fairly good
	Sprays—Bordeaux, 4-4-40	50	all	0	Good
Prince Edward Island	Bordeaux, Tribasic copper sulfate, copper oxychloride sulfate, cuprous oxide ("Perenox"), "Dithane" (small amount), mostly spraying				Control with persistent program
Rhode Island	Neutral Copper dust, 6% Cu	20	all	0	Fair
	Bordeaux spray, 10-5-100	75	all	0	Good
	Neutral Copper (50%) spray, 4 lbs./100 gal.	4	all	0	Good
	Ethylene bis dithiocarbamates 2 lbs./100 gal.	1	all	0	Good
South Carolina	Fixed Copper dust, 6% Cu Practically no spraying	25	90	10	Satisfactory
South Dakota Clark area Watertown area	"Yellow Cuprocide" dust, 30 lbs.	60	50	50	Fair
	"Yellow Cuprocide" spray, 1.5 lbs.	15	all	none	Fair
	"Zerlate" spray, 2 lbs.	25	all	0	} Poor to fair
	"Yellow Cuprocide" spray, 1.5 lbs.	10	all	0	
	"Dithane" D-14 (Spray) 4-1½	5	all	0	
Tennessee	Sprays—				
	Tribasic copper sulfate, 4-100	10	all	0	Fair
	Bordeaux, 8-8-100	Few	all	0	Fair
	"Dithane D-14"-zinc-lime, 2 qts.-1½-100	Few	all	0	Fair
	Some alternate applications of last two				
	Very little commercial dusting				
Virginia	Fixed copper dust, 5% Cu with 3% DDT	5	}		Favorable with all materials
	Bordeaux spray, 8-8-10	1-2			
	"Dithane Z78"	trace			
West Virginia	Dusts—				
	"Yellow copperoxide," 4.8% Cu	20	all	0	Fair to poor
	Tribasic copper sulfate, 7% Cu	20	all	0	Good
	Copper lime, 20% Cu-80% lime	5	all	0	Good
	Sprays—				
	Bordeaux 4-4-50	70	all	0	Good
	Tribasic copper, 53% Cu (4 lb./100 gal.)	20	all	0	Good
	"Dithane"-zinc-lime	1	all	0	Poor
Wisconsin	Dusts— Tribasic copper and Copper A	2	50	50	No blight present
	Sprays—				
	"Dithane D-14"	8	all	0	} All sprays fair to good. Dusts and sprays all with DDT.
	"Parzate 1½"	2	all	0	
	Tribasic copper, 4 lb.	5	all	0	
	Bordeaux 8-12 + 8-12 + 100	40	all	0	

TABLE III

Control of tobacco blue mold: Materials used and effectiveness in 1948

State or Province	Material and Formula	Percent growers using	Results
Connecticut	"Fermate" 1-50	90	Excellent
	"Dithane Z-78" 1-48	1	Good
	"Phygon" 1-50	Tests	Severe leaf burning
	Oxyquinoline benzoate $\frac{1}{2}$ -50	Tests	Stunting and leaf burn
Florida	"Fermate" dust (20% "Fermate," 80% talc)	75	Satisfactory when used as recommended
	"Parzate" dust, 10%	Tests	Infection too slight to judge
Georgia	"Fermate" spray, 4 lbs.-100 gal., and dust, 15%	82	Almost perfect commercial control with all materials
	Bismuth subsalicylate spray	3	
	"Dithane Z-78" spray		
	"Dimole" ("Fermate"—salicylic acid mixture)		
Kentucky	Prepared to use "Fermate" spray or dust or "Dithane" Z-78 dust		Very little used because of very mild attack
Maryland	"Fermate" (15% dust)	70	Excellent
	"Fermate" spray (2,4-100)	5	Excellent
	Other organics	Trace	Mostly tests; results valuable, mostly good
Massachusetts	"Fermate" spray 2-100	75	Good
	"Fermate" dust 20%	5	Good
	Paradichlorobenzene used occasionally along with "Fermate" to eradicate the fungus from infected beds		Good
Ontario	"Fermate" spray 2-40	65	Good
	"Fermate" dust (Mfr.)	25	Good
	Paradichlorobenzene 3 lb.-100 sq. yds.	4	Good (where properly used)
	Benzyl salicylate (aerosol bomb)	Less than 1	Uncertain (minor injury)
Pennsylvania	"Fermate" spray	65 or more	
	Bordeaux 8-4-100	15	
	Copperspray (2 lb. Cu-100 gal.)		
South Carolina	"Fermate" dust 15%	95	Good to excellent
Tennessee	"Fermate" spray 2-4/100	most	Fair
	"Fermate" dust 15%	some	?
Virginia	"Fermate" spray 3-100	50	Good
	"Fermate" dust 15%	10	Good
	"Parzate" dust and spray	Trace	Good
West Virginia	"Fermate" spray 2-100	40	Good
	"Fermate" dust	40	Good
Wisconsin	"Fermate" spray in experimental spraying	7 farms	Disease was not found in survey of tobacco area

TABLE IV

Control of downy mildew of cucurbit crops: Materials used in 1948

State	Fungicide and Formula	Percent growers using	Results
Delaware	"Dithane Z-78" dust, 6%	5	Downy mildew not much factor in 1948
	"Dithane Z-78" spray, 2-100	5	

AAEE Meets in Dec.

Discussions of new insecticides, reports on their toxicity, formulation, and mode of action will feature the annual meeting of the American Association of Economic Entomologists at the New Yorker Hotel, New York, December 13, 14, 15 and 16. The A.A.E.E. will hold some sessions jointly with the Entomological Society of America.

Dr. Charles E. Palm, Cornell University, chairman of the program committee, stated at press time that although all details had not been worked out, the program will be given over to general sessions in the mornings with invitation speakers. The afternoon and evening sessions will feature section meetings.

The A.A.E.E. president, S. A. Rohwer, assistant chief, Bureau of Entomology and Plant Quarantine, U.S.D.A., will address the group on the morning of Dec. 13, and his talk will be followed by a preliminary business meeting. The sections on Medical Entomology, Apiculture and Plant Quarantine will meet Monday afternoon.

That evening will see a continuation of the section on Medical Entomology, and a joint symposium will be held with the Biometric Society of America to discuss biometrical methods for entomological research.

Invitation papers dealing with the toxicity of insecticides to plants and animals other than insects will occupy the general session Tuesday morning. The section on insecticides and a paper reading session follow on Tuesday afternoon. The A.A.E.E. will join with the E.S.A. for an evening session at which an E.S.A. speaker will be featured.

The announcement by manufacturers of new insecticides for either experimental or commercial use in 1949, will be one of the features of the section on insecticides. Both industry and official agencies are invited to make brief statements on industrial chemicals or formulations which have not yet been introduced to entomologists generally.

Industry is invited also to announce new proprietary insecticides

	"Zerlate dust," 8-10%	70	
	"Zerlate spray," 2-100	5	
Florida Bradenton	Copper dusts, 7% Cu	20	Poor
	"Parzate" dust, 5% active in pyrophyllite	15	Poor
	"Dithane D14" + zinc sulfate + lime spray, 2-1-½-100	50	Both sprays good where application thorough
	"Zerlate" spray, 2-100	15	
Dade Co.	"Dithane D14" + zinc sulfate + lime, 2-1½-100	one grower	Good
Georgia	Bordeaux spray, 2-2-50	} Very few	
	Tri-basic Copper, 4-100		
Louisiana	"Fermate" dust, 10-100	5	Good
	Copper dust, 7% Cu	50	Good
	Bordeaux spray, 4-4-5	40	Good; moderate injury
Maryland (lower eastern shore)	Fixed coppers (5-7% dust)	15 % acreage	Downy mildew was not a problem in 1948. Macrosporium leaf spot was widespread. Copper compounds gave fair to poor control and Zerlate poor control of this disease
	"Zerlate" (10% dust)	trace % acreage	
(central eastern shore)	Bordeaux (6-3-100) spray	55% acreage	
	Fixed copper (4-100) spray	10% acreage	
	"Zerlate" (2-100) spray	20%	
	Fixed copper dust (4-7%) "Zerlate" dust 10%	acreage 10% acreage	
Pennsylvania	Copper sprays and bis carbamates		Good. Probably over 75% of commercial growers sprayed or dusted.
Tennessee	On muskmelon — "Copper A" spray, 2-100	Plots	Obscured by weather
Virginia	Fixed copper dust, 5% Cu	10	Good

to be marketed for the first time in 1949, or which have been introduced since the 1947 meeting of the section. These announcements are to mention brand name, composition (so far as disclosure is possible) and type of formulation, and intended use. Each

Requests for time on this program should be addressed to Dr. L. B. Norton, Dept. of Entomology, Cornell University, Ithaca, N. Y., before Dec. 1. Requests should be accompanied by a resume of the announcement.

speaker is limited to about 5 minutes, and should bring some 300 copies of his announcement for discussion at the close of the session.

Wednesday morning's general session will feature invitation speakers dealing with topics including the

formulation of insecticides, mode of action of organic insecticides, physiological appraisal of toxicity and chemical structure in relation to insecticidal activity. The afternoon meeting that day will include the meeting of the section on teaching entomology, in addition to paper reading sessions. The annual A.A.E.E.-E.S.A. banquet will be held that evening.

The final business meeting of the A.A.E.E. will be held on Thursday morning, in addition to the presentation of invitation papers from a number of national industry organizations. These papers are expected to express their views on the work of the entomologists, and to point out some of the mutual problems facing the groups.

The four-day meeting will close in the late afternoon of Thurs-

day, following the final paper-reading session. The Association extends a welcome to visitors, suggesting that they register and obtain badges.

NFA Fall Meeting

The 22nd annual Fall meeting of the National Fertilizer Association was scheduled to be held at the Atlanta Biltmore Hotel, Atlanta, Ga., November 15, 16 and 17. Full report of the meeting will be carried in Agricultural Chemicals in the December issue.

The program was to include an address by Dr. Russell Coleman, new NFA president who assumed office on November 1. Other speakers include Gordon Clapp, chairman of the board, Tennessee Valley Authority, Knoxville, Tenn.; Dr. Firman E. Bear, chairman, soils department, N. J. Experiment Station, New Brunswick, N. J.; F. H. Leavitt, technologist, agricultural department, Shell Chemical Corp., San Francisco; Dr. C. C. Murray, director, Georgia Agricultural Experiment Station, Experiment, Ga.; and Ray L. King, chairman of the NFA board of directors. The annual dinner was to be held on the evening of Nov. 16, with C. T. Prindeville, vice-chairman of the board of directors, toastmaster.

WEED COMMITTEE

(Continued from Page 21)

everybody. A central Committee of the Weed Conferences is being "talked" about in weed control circles at present, and these conversations may be translated into action in 1949. The approaching 1948 major weed conferences will present a real opportunity for further consideration of this important subject.★★

CONTROL OFFICIALS

(Continued from Page 35)

The subject of boron was covered by R. C. Berry, Richmond, Va.; Zinc and copper by H. J. Webb, Clemson, S. C.; and mixing and segregation by Dr. E. M. Constable, Raleigh, N. C.

Following the afternoon pro-

New York State Holds 10th Annual

Insecticide and Fungicide Meeting

THE tenth annual New York State Insecticide and Fungicide Conference was to be held at Cornell University, Ithaca, N. Y., for three days; November 10, 11 and 12. The advance program, released ten days before the meeting, stated that sessions were to begin on the afternoon of Wednesday, Nov. 10. The first meeting, in the Plant Science Building, covered the subject of application equipment. O. C. French of Cornell, was to be in charge.

Papers prepared for presentation included: "Research Program in Application Equipment at Cornell University," O. C. French and Dr. Charles E. Palm, Cornell; "The Fixed Outlet Cornell Spray-Duster," by Drs. K. G. Parker and R. M. Pratt, Cornell; "The Flexible Outlet Spray-Duster," by Dr. C. W. Terry and L. R. Brown, Cornell; "A New Experimental Concentrate Sprayer," by Dr. J. L. Brann and W. W. Gunkel, Cornell; "Livestock Spraying Equipment" by Dr. J. G. Matthyse, Cornell; and "Some Thermal Aerosol Equipment Applications" by G. G. Gyrisco, Cornell.

The evening session, beginning at 7:30, was to continue the equipment discussion, with Dr. L. M. Massey as chairman. A paper, "Row Crop Machinery — Problems and Trends" by J. D. Wilson, Ohio Agricultural Experiment Station, Wooster, Ohio; and Frank Irons, U.S.D.A., Toledo, Ohio, was to be first on the evening program. Other papers were to include "The Evolution and Problems of Soil Fumigation Equipment," by Dr. A. L. Taylor, Shell Chemical Corp., New York. This was to be followed by a panel discussion of Aircraft Application Equipment, under the chairmanship of Dr. W. A. Rawlins, Cornell. Eight minute talks were to be given by John O'Neill, Barker, N. Y., "Fixed Wing Aircraft" and Edward Robinson, Syracuse, N. Y., "Rotary Wing Aircraft." These two

were to represent commercial operators. A group of Station workers were also to appear on the panel. The speakers and their subjects include A. M. French, Ithaca, "Potato Disease Control;" Dr. W. T. Schroeder, Geneva, N. Y., "Tomato Disease Control;" Dr. A. B. Burrell, Cornell, "Tomato Disease Control;" Dr. L. A. Carruth, Geneva; "Seasonal Scab Control;" and Dr. J. L. Brann, Cornell, "Dust Formulation."

Sessions were to resume on Thursday morning, Nov. 11, at Bibbins Hall Auditorium, GLF Building. Lea S. Hitchner, executive secretary of the Agricultural Insecticide and Fungicide Association, New York, was to discuss "Recent Criticisms of Pest Control Practices;" Dr. H. W. Thurston, Professor of Plant Pathology, Pennsylvania State College, "Impressions of the Newer Fungicides Based on 1948 Tests;" R. M. Pratt and L. R. Brown, Cornell, "Spray-Dusting versus Concentrates;" and John G. Goodrich, fruit grower of Niagara County, New York, "Materials and Machinery from the Point of View of a Grower."

Thursday afternoon's session under the chairmanship of Dr. L. M. Massey, was to start with a series of reports on fruit insect control. Reports were to come from a group of entomologists including Dr. P. J. Chapman, Dr. E. H. Glass, Dr. Ralph Dean, and Dr. E. F. Taschenberg, Geneva; Dr. J. E. Dewey and L. R. Brown, of Cornell, and D. Hamilton of the U.S.D.A. Dr. E. H. Smith, Cornell, was to present the 1949 recommendations for fruit insect control.

A panel on Fruit Disease Research was to include talks as follows: "Tests With New and Old Materials," by Dr. J. M. Hamilton; "Some Ways in Which Fungicides Influence the Quality and Quantity of the Apple Crop," by Dr. D. H. Palmiter, Geneva and Poughkeepsie;

and "Results of Grape Spray Program" by Dr. A. J. Braun, Geneva. Dr. W. D. Mills was to complete the afternoon program with 1949 recommendations for fruit disease control. The annual dinner was scheduled for Thursday evening, with a color movie on the red-banded leaf-roller being shown.

The final day's program was to begin with a report by Dr. W. T. Schroeder, Geneva, on "Results of Tomato Spraying in 1948." Dr. A. G. Newhall, Cornell, was to speak on nematocides, and Dr. C. Chupp, Cornell, was to present the "Vegetable Disease Control Recommendations for 1949." Reports on vegetable disease research were scheduled for the morning session. These were to be given by Drs. L. A. Carruth, G. E. R. Hervey, Geneva, and W. A. Rawlins, Cornell. Dr. R. W. Leiby, Cornell, was to present the "Vegetable Insect Control Recommendations for 1949."

Friday afternoon's program, under the chairmanship of Dr. P. J. Chapman, was to have reports on potato disease control research, with results of tests in Western New York State by A. M. French; and on Long Island, by R. C. Cetas, Cornell. Dr. C. Chupp, Cornell, was to give the Potato Disease Control Recommendations for 1949.

"Potato Insect Control Research and Recommendations for 1949" were to be announced by Dr. Rawlins, followed by a discussion on "Nursery Insect and Disease Control" by Drs. F. L. Gambrell and H. C. Young, Geneva, and Dr. Matthyse, Cornell. Insect control on ornamentals was to be covered by Dr. W. E. Blauvelt; and disease control on ornamentals was to be covered by Dr. A. W. Dimock, Cornell. Final discussion of the meeting was to be on "Livestock Insect Control," by Dr. H. H. Schwardt, Cornell. (A full report will be in the December issue).

N.S.D.A. Names Committees

The National Sprayer & Duster Association at its quarterly meeting held in New York City, October 22nd, elected P. L. Hauser to membership on the Executive Board, according to Earl D. Anderson, Association Secretary. Mr. Hauser is General Sales Manager of the Lowell Manufacturing Company, Chicago. Members of Association Committees were also announced by

R. C. Hudson, President of the Association.

Chairmen of the principal committees are as follows: General Planning Committee, R. C. Hudson, H. D. Hudson Mfg. Co.; Markets and Publicity Committee—General Chairman, C. D. Leiter, F. E. Myers & Bros. Co.; Markets Committee, D. P. Lewis, H. D. Hudson Mfg. Co.; Publicity Committee, H. F. Brandt, Dobbins Mfg. Co.; Research Commit-

tee, G. S. Collier, Dobbins Mfg. Co.

N.S.D.A. members report that they anticipate an increasing demand for spraying and dusting equipment on the part of farmers, the food processing industry and others for controlling insect and weed pests. New and improved models of equipment will be on the market next year, designed to make the pest control job easier and more effective. The Association's headquarters are located at 4300 Board of Trade Building, Chicago 4.

Officers Re-Elected

All officers of International Minerals & Chemical Corporation, Chicago, were re-elected by the company's Directors following the annual meeting of the stockholders on October 28. The officers are: Louis Ware, president; James P. Margeson, Jr., executive vice-president; Robert P. Resch, vice-president and treasurer; Franklin Farley, vice-president in charge of phosphate division; Maurice H. Lockwood, vice-president in charge of plant food division; A. Norman Into, vice-president in charge of potash division; Dr. Paul D. V. Manning, vice-president in charge of research; Edward D. McDougal, Jr., general counsel and secretary; Edward Tubbe, comptroller; Stacy C. Thompson, assistant secretary; Carl F. Husen, assistant comptroller; and James A. Barr, chief engineer.

Victor Opens New Unit

Victor Chemical Works' second new plant to be completed since the war began operations on November 1 at Morrisville, Pa., the company has announced from its headquarters in Chicago. The establishment of the Morrisville plant brings to five the number of plants now operated by Victor. Work on the new unit was begun in October, 1947, and was completed on schedule.

Output of the new plant will be phosphoric acid and other phosphate compounds. Elemental phosphorus, used at Morrisville, will be shipped from Victor's phosphorus-producing plants located in Tennessee and Florida. In addition to the new plant, expansion of existing plants at

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They combine excellent dispersing action with minimum lowering of surface tension or wetting action.

This is important in agricultural spray preparations. Increased dispersion of toxicant and carrier usually results in greater insect or disease control due to better suspension, more uniform coverage, and increased tenacity.

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Chicago Heights, Illinois and Nashville, Tenn., is also nearing completion.

Flying Farmers To Meet

The National Flying Farmers Association has tentative plans for a meeting in Chicago, Wednesday, December 1, in which the group would meet with representatives of the Agricultural Research Administration, the Civil Aeronautics Authority, State Aeronautics associations, chemical manufacturers, State Experiment Stations, Land Grant Colleges, the Agricultural Editors Association, and the aircraft industry. The conference would discuss problems of applying insecticides, fungicides and herbicides with airplanes.

Herbert Graham, Stillwell, Oklahoma, executive secretary of the N.F.F.A., stated late in October that plans were being made for such a meeting, but that all details had not been worked out.

Cavanagh Wins in Mich.

Joseph A. Cavanagh who has been associated with the Dow Chemical Co. since 1909, and who recently retired as head of the Agricultural Chemical Sales Division, was elected to the Michigan State Legislature on the Republican ticket from the Midland, Mich. district on Nov. 2. He had previously been an alderman and supervisor, and in 1916 was elected mayor of Midland, serving for four years. At the end of his term, 1920, Mr. Cavanagh was placed in charge of insecticide sales for Dow and retired from politics, not to return until the present campaign.

Born on a farm near Cadillac, Mich., Mr. Cavanagh graduated in chemistry from Michigan State College in 1907. For a short time, he worked as a sugar chemist in Cuba, then for Liquid Carbonic in Chicago, and Corn Products in Davenport, Iowa. In 1909, he was offered a job as chemist by Dr. Herbert H. Dow, founder of Dow Chemical. He has been associated with that company ever since, working first in the production department and later as director of insecticide sales. At

present, he is associated with the company as consultant. He has four

children and eleven grandchildren, including two sets of twins.

Sherwin-Williams Expands Ag. Chemical Division



DR. E. D. WITMAN

A major reorganization in the Agricultural Chemicals Division of Sherwin-Williams Co., Cleveland, Ohio, was announced recently by D. S. Gaarder, Director of the Division. The shift has brought about the advancement of six divisional executives within the organization.

Dr. E. D. Witman, formerly in charge of Fundamental Research and Laboratory Development, is now assistant to the Director. Dr. Witman is a former Associate Professor of Chemistry at Ohio State University, and has been associated with Sherwin-Williams Co. for the past 12 years. During the late war he served as a consultant for the Office of Scientific Research and Development. He was among those responsible for the original ester formulation of 2,4-D, and has developed numerous other patented advances in the field of agricultural chemicals.

L. P. Harris, formerly in charge of West Coast Technical and Manufacturing Operations at Oakland, Calif., has been named Superintendent of the newly-created S-W Agricultural Chemical Technical Service Dept. which will combine all technical activities under one head. Mr. Harris is a graduate of the University of Washington, Seattle, and took post-graduate work in entomology at Ohio State University.

R. A. Burton, until now a Sherwin-Williams institutional prod-



R. A. BURTON

ucts sales manager, becomes Sales Promotion Manager of the Agricultural Chemicals Products Division. Long associated with advertising and merchandising activities, Mr. Burton has been with the company for eight years.

C. A. Ziroli, until now Sales Promotion Manager of Agricultural Chemical Products, has been named manager of the Central Zone which extends west from Pennsylvania to the Mississippi River and north from Tennessee to the Canadian border. Ziroli will be responsible for market development within the zone. He joined the company in 1936 and was transferred to the Agricultural Chemicals Division in 1945.

K. J. Lipe, for the past year an Agricultural Chemical Products Division salesman covering the Colorado-Wyoming territory, has been appointed Zone Manager for the Great Plains Area which extends westward from the Mississippi River to the Rocky Mountains and north from Texas to the Canadian border. He will be stationed at Kansas City, Missouri.

J. R. Nail, a staff member of the Agricultural Chemical Products California Division for three years, was appointed manager of the West Coast zone. Mr. Nail began his association with Sherwin-Williams in 1947 in its Yakima, Washington office and was later active in Oregon.

the Corporation President



WHO ALMOST SLEPT TOO LONG

T. M. Stanton* was having a nightmare. For months he'd been preoccupied with the production problems of Empire Gadgets, Inc. So preoccupied, he'd even half-admitted to himself that he was devoting far less thought to national problems than a leading citizen should. But the urgency of his immediate interests kept shoving these concerns into his subconscious mind. Now they were torturing his sleep.

"T. M., old boy," one spectre was saying, "how would you like a nice black depression to come along and swallow up your whole company?" And a green-eyed ogre leered, "While you're neglecting your free-enterprise system, we're moving in with another system!"

Stanton's body lurched. "No!" he thundered. Awakened, he scratched his head, murmuring, "Gad, what a dream! H-m-m—wonder what sort of contribution I ought to be making..."

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The Treasury Department acknowledges with appreciation the publication of this message by

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(Continued from Page 66B)

gram, opened by a discussion on the model state fertilizer bill by Dr. D. S. Coltrane, Raleigh, N. C., a panel on trends in fertilizer control work was held. Dr. H. B. Siems, Swift & Co., Chicago, presented the industry side of the picture. He said that manufacturers are trying their best to make every pound of fertilizer come up to analysis. Allowances are made for normal shrinkage, yet occasionally outside conditions cause variations in tests, he declared.

New and more efficient manufacturing processes are needed to remedy some of the difficulties involved, such as segregation of materials after mixing, etc. The generally higher analyses now being used in agriculture tend to make more difficulties, Dr. Siems pointed out, and continued by saying that the quality of labor is low, requiring extra supervision.

Despite all handicaps, the fertilizer industry has done a magnificent job, he declared. He pointed out that if fertilizer products were to sell at hundreds of dollars per ton, the industry could well take special pains to see that every bag should be uniform. Actually, uniformity must be achieved on a broader level, Dr. Siems affirmed. Due to raw material shortages, the fertilizer manufacturer must more or less accept and use whatever materials are available, he continued.

Dr. Cloaninger, president-elect of the association, stated in his talk that the manufacturing industry has improved its products over the past few years. The Association of Fertilizer Control Officials can do a great deal toward attaining uniformity, he said, and the association is working toward this end by keeping abreast of new trends.

He pointed out that over the country there is now much more uniformity than in past years, since most of the important fertilizer-using states now have laws governing the sale and distribution of the materials.

Report of the States Relations Committee was presented by Dr. Halvorson, and the Executive Committee report was given by Dr. Quackenbush. The meeting ended

with reports of special committees, and the election of officers.

On the evening of October 10, the fertilizer officials were invited by the American Plant Food Council, to a banquet held at the Shoreham. The program was brief, with a talk by the Council's president, Clifton A. Woodrum, and the introduction of staff members and guests.

A.O.A.C. Elects

FOLLOWING the meeting of the fertilizer officials, the Associa-

tion of Official Agricultural Chemists, Inc., held its sixty-second annual meeting at the Shoreham for three days beginning October 11. The group elected as its president, L. S. Walker, Burlington, Vt., to succeed G. H. Marsh, Montgomery, Alabama. The new vice-president is W. A. Queen, Washington, D. C., succeeding Mr. Walker; and the secretary-treasurer is Henry A. Lepper, Washington, D. C., succeeding himself. New members of the executive committee were named as follows: Mr.

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Marsh, the retiring president; W. B. White, Washington, D. C.; H. A. Halverson, St. Paul, Minn.; and H. J. Fisher, New Haven, Conn.

The group held sessions on agricultural chemicals including one on fertilizers, presided over by Dr. Quackenbush. Discussion was carried on by H. R. Allen, K. D. Jacob, W. L. Hill, J. D. Hardesty, Colin W. Whittaker, M. P. Etheridge, O. W. Ford and Dr. Quackenbush. Contributed papers were presented by H.

K. White, O. W. Ford and S. R. Miles.

In an afternoon session of the first day a session on economic poisons was held under the chairmanship of Dr. J. J. T. Graham. J. W. Elmore discussed rodenticides, E. E. Fleck, DDT; S. A. Hall, tetraethyl pyrophosphate; A. B. Heagy, herbicides; F. A. Spurr, insecticides containing Derris and Cubé; L. Keirstead, oil emulsions; and Dr. Graham, a general referee's report.

The AOAC meeting was concluded on the afternoon of October 13, with a business meeting with retiring president G. H. Marsh presiding. Reports were heard from committee chairmen, and new officers were elected as the final event of the meeting.

That evening, the National Fertilizer Association invited members of the AOAC to a banquet at the Mayflower Hotel. Interim president F. S. Lodge acted as chairman of the meeting, introducing guests and staff members to the assembly.

Feed Officials Meeting

THE final meeting of the week was held by the Association of American Feed Control Officials, Inc. at the Shoreham. The Association elected A. M. G. Soule president, to succeed Wm. L. Hunter, Sacramento, California who becomes ex-officio member of the Executive Committee. The new president is chief of the Division of Inspection, Department of Agriculture, Augusta, Maine.

The new vice-president is Dr. Bruce Poundstone, head of the Department of Feed and Fertilizer, University of Kentucky, Lexington. He succeeds Mr. Soule. Continuing as secretary-treasurer, is Leslie E. Bopst, College Park, Md.

The association's Executive Committee is composed of the three officers, the past president, J. J. Taylor, Tallahassee, Fla., chairman, and John B. Smith, Kingston, R. I.

MARKET REPORT

(Continued from Page 43)

coming season. Although superceded for the most part in agricultural endeavors by DDT and other materials, there is a renewed interest in pyrethrum due to the low pressure aerosol bombs for household use.

As of October 1, 1948, representatives of the Kenya Growers Association announced a new price of 29.8c per lb. landed in the United States for 1.3 flowers. This represents an increase of approximately 18%. Already the industry has raised the price of 20-1 concentrate as well as the 20% purified material for low pressure bomb use.

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A benzene hexachloride formulation containing 6% gamma isomer.

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A chemically stable insoluble basic copper sulphate containing 53% metallic copper for use in preparing sprays or dusts.

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And don't overlook these widely used Geigy DDT compositions. They also represent opportunity to manufacturers and processors of packaged insecticides for the retail trade.

GEIGY* D-30

A solution containing 30% Geigy DDT (by weight) for dilution with liquids, to control flies, mosquitoes, bedbugs, cockroaches, fleas and certain other insects.

GESAROL* VD-50

A finely-ground powder containing 50% Geigy DDT. For general agricultural use after addition of diluents to formulate DDT dusts adapted to control specific pests.

Geigy Company, "Originators of DDT Insecticides" are now broadening their base of operation in the field of pesticides. These three new Geigy products have been tried and proven. They are of traditional Geigy quality. Use them with confidence in dust mixtures for agriculture. They will help you build business. Your inquiries are invited.

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DDT
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The Kenya delegation now in the U.S. has indicated that the quantity to be available for worldwide consumption from this source during the 1948-1949 season will be 2,000 tons, while the quantity estimated from this source during the 1949-1950 season is 3,000 tons. The Belgian Congo, on the other hand, estimates that it will have export of approximately 1500 tons each during the 1948-1949 and 1949-1950 seasons.

It is of interest that the 1947 crop from Kenya yielded 3900 tons for export, the 1946 crop 6700 tons and the 1945 crop yielded 7400 tons. It will be recalled that the government-to-government agreement on pyrethrum between the United States and Great Britain was concluded as of December 1947 and production from Kenya fell off even prior to this time. Growers have indicated that the price at which pyrethrum is available is not sufficiently attractive and, therefore, their production has suffered.

Industry spokesmen point out that in addition to the short crop, expanding interest in the low pressure aerosol field and the threat of government stockpile for security reasons—all add up to a shortage for next season.

What About Parathion?

PARATHION should be available next year in sufficient quantities to meet requirements for the limited uses that will be permitted. There are at least four producers of the material at the present time—Eston Chemicals, American Cyanamid, Monsanto and Pittsburgh Agricultural Chemicals. Price quotations at the present time are \$2.25 per lb. in carload lots, while LCL quantities are quoted at \$3.00 per lb. Due to recent increases in the cost of raw materials, there is a possibility of an increase in these prices.

Tetraethyl pyrophosphate is available in adequate supply. Leading producers quote the material at 80c per lb. in CL quantities and 90c per lb. in LCL quantities. The technical material being offered generally is the 40% content of the active ingredient.

* * * *

2,4-D acid, salts and esters are

expected to be available in about the same quantities as they were during last season.

Monochloroacetic acid, which heretofore has been a raw material problem in the production of these herbicides, is now in adequate production. Phenol, on the other hand, continues to be a bottleneck and will limit the quantity of 2,4-D which can be produced.

Current quotations on the

2,4-D acid are 75c per lb. in CL quantities.

Copper sulphate and other copper bearing fungicides are in long position at the present time and will be available in sufficient quantity next year to meet agricultural requirements. However, due to the recent increase in the price of metallic copper, there has been a corresponding increase in the price of these copper chemicals. The best informa-



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2. BLACK LEAF 155 — for spraying apples and pears to control codling moth, also for controlling grape berry moth.
3. BLACK LEAF DRY CONCENTRATE — used as a spray or dust — a dry powdered nicotine compound for easy mixing and handling.
4. BLACK LEAF 155 WITH DDT — for spraying apples and pears for the control of codling moth, leafhoppers, and similar pests.
5. BLACK LEAF 10 DUST BASE — meets the demand for a nicotine compound easily mixed with non-alkaline carriers to make a neutral dust.
6. BLACK LEAF CUNIC DRENCH — for sheep and goats. Formula recommended by U. S. Department of Agriculture.
7. BLACK LEAF POWDER AND PELLETS — for controlling the large roundworm (*Ascaridia galli*) in chickens.
8. MASH-NIC — for mixing with poultry feed to control large roundworm.
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tion in the metal trade indicates that the price of metallic copper will continue at the current level of \$0.23½ per pound over the period of the next several months. The shortage of the metal is due to increased demands for domestic uses, and increasing demands for export requirements through E.C.A. The necessity for stockpiling the metal which will serve to keep demand active and the price firm, is always present. Within recent weeks, there has been considerably more interest shown by government circles in the necessity for this stockpiling.

* * * *

There does not appear to be any problem for sufficient amount of raw materials to assure an adequate production of lead and calcium arsenate. At the present writing, the price of lead and arsenic, in particular, is still at the elevated level and there does not appear to be any possibility of lower prices.★★

CRABGRASS CONTROL

(Continued from Page 27)

crops, there are no chemicals reported to date that even approach the answer to such a problem. Certainly there is much need for experimental work on the control of crabgrass, one of the most troublesome annual weeds in North America. Research on the chemical control of this plant indicates the possibilities of chemicals that will kill crabgrass selectively in turf. Pre-emergence control in cultivated field crops such as corn and potatoes is a distinct possibility and such control is being utilized in a limited way. Good progress in the chemical control of crabgrass has been made and further research should result in its eventual control in desirable turf and crop areas.★★

Export Deadline Extended

The deadline for placing certified export orders for the foreign nitrogen fertilizer program has been extended to November 30 by the Department of Commerce. This move affects the foreign nitrogen program to accommodate China, Greece and a few Latin American countries. The extension does not affect the bulk of

the 30,500-ton commercial export program, however, including more than 5 percent of the commercial nitrogen exports which the Department specified in earlier announcements of export allocation which are to move abroad before January 1.

Takes Sharples Territory

Sharples Chemicals, Inc., Philadelphia, has announced the ap-



DR. FRANK B. POPE

pointment of Dr. Frank B. Pope as a member of the company's Chicago sales office. His territory will consist of North Dakota, South Dakota, Wisconsin, Michigan, Minnesota and Ohio.

Carvel Elected Governor

Elbert N. Carvel, president of Valliant Fertilizer Co., Laurel, Del., was elected Governor of Delaware in the election of November 2. Mr. Carvel has the distinction of being the first Democratic Governor the state has elected for a half century. He was previously Lieutenant Governor of the state.

Aside from his political activities, the Governor-elect is vice-president of the Del-Mar-Va Fertilizer Association for 1948, and is a member of the Board of Directors of the National Fertilizer Association.

Kramer Opens New Office

Albert J. Kramer, formerly Patent advisor to the U. S. Department of Agriculture, Washington, has announced the opening of his own office to practice patent law in Wash-

ington. He is author of a recently published book, "Inventions at Your Service," and was formerly responsible for the publication of the U.S.-D.A. Official Patent Manual. His offices are located in the Washington building, Washington, D. C.

N.Z. Ag. Association Forms

The New Zealand Agricultural Chemical Manufacturers Federation was formed recently at a meeting in Wellington. The new organization is composed of about forty member firms engaged in the manufacture of insecticides, fungicides and herbicides, growth regulators and stock remedies. It is a part of the New Zealand Manufacturers Federation, an older organization. The secretary of the organization is D. I. MacDonald.

SEABROOK FERTILIZER

(Continued from Page 41)

"green" fertilizer. In the latter case, the ammonia liquor is added to the fertilizer immediately before loading on the truck. Such fertilizer must be spread without delay to prevent its hardening which would make spreading difficult.

Conclusion

FERTILIZER valued at approximately ⅓ million dollars was applied in 1947 to 14,000 acres of vegetables at Seabrook Farms. The amounts of fertilizer and analysis used on each field were determined by careful rapid soil analysis. The rapid soil tests have been standardized against actual crop production. About 5 different grades of fertilizer are being used to supply nutrients to different crops on different fields. Applying fertilizers according to soil needs as measured by rapid soil tests has given better balanced fertilizers.

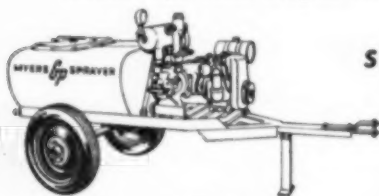
Fertilizers are largely made up from the inorganic materials, ammoniated superphosphate, run-of-pile super, and muriate of potash. The ammoniated superphosphate form of nitrogen is more resistant to leaching than some of the organics. The trace elements boron and manganese are supplied in all mixed fertilizers as borax and "Tecomangam."



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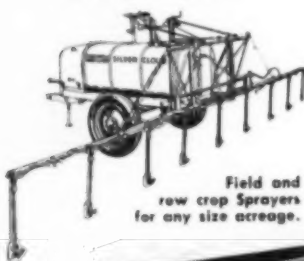
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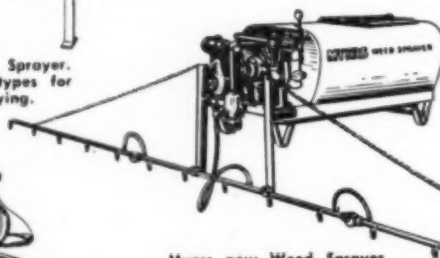


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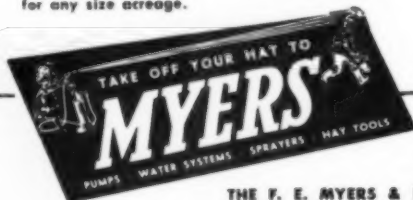
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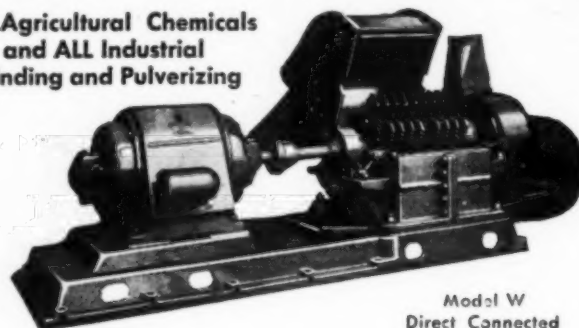


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Literature Cited

1. Wolf, B. and V. Ichisaka, "Rapid chemical soil and plant tests," Soil Science 64:227-244, 1947.

VIRUS YELLOWS

(Continued from Page 47)

with Marshall or other good indicator variety. Plants proved to be free of virus must be propagated under surveillance in an area free from the insect carrier for eventual replacement of the planting stock now being used.

Spread of yellows from plant to plant depends upon the presence of the white strawberry aphid. Maintenance of virus-free strawberry plants in the Pacific Coast area has been extremely difficult because of the widespread and common occurrence of this aphid vector in all of the principal strawberry-growing sections. Mr. Demaree has examined many strawberry fields in several eastern States during the past eight years and has found this aphid in only five widely separated areas. No general survey has been possible, however. If it is true that the aphid is established in only a few restricted locations east of the Rocky Mountains, there should be little difficulty in maintaining virus-free stock in the aphid-free regions, provided the aphid is not subsequently introduced on imported plants.

Aster Yellows

ASTER yellows is a widely distributed virus disease with a very wide host range including both economic plants and weeds. J. G. Leach of West Virginia University reports that it became very prevalent on lettuce in the Canaan Valley of the State during the summer of 1948. The Canaan Valley is an upland

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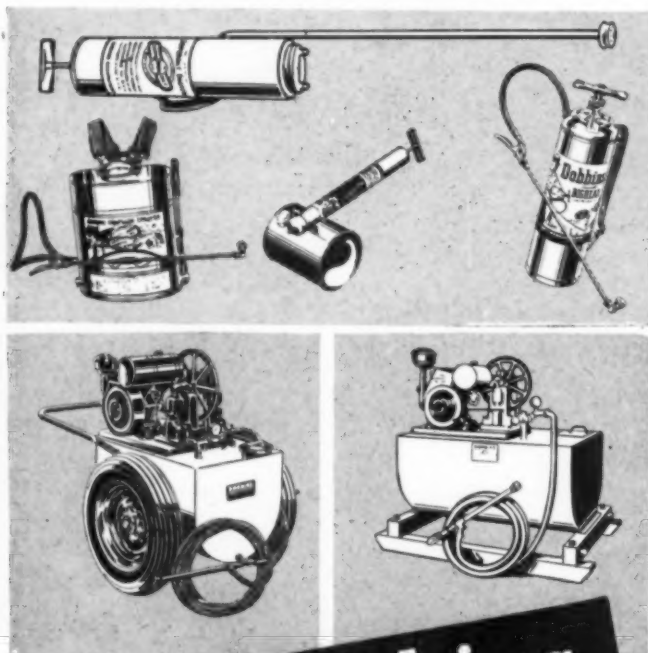
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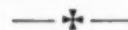
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Mul-si-mo, we believe, is the cheapest and most economical Emulsifier on the market for the emulsification of the oils above specified.

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Extensive tests have shown *Mul-si-mo* to be non-toxic to plants when used at a dilution of 1 to 100. (Plants used in tests—*Coleus*.) As summer oils are usually used at the dilution of half-gal. to 100 gals. water, at such dilution the rate of *Mul-si-mo* to water would be 1 to 20,000.

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AGRICULTURAL CHEMICALS

valley about 3000 feet above sea level where an effort is being made to stimulate the production of cool weather crops. The soil and cool summer weather of this Valley are ideally suited to the raising of head lettuce. Promising yields were obtained on a few trial plots last year, and this year about 22 acres were planted to try out commercial production. Aster yellows was very damaging, as high as 50 percent of the plants in some fields being affected. The leaf hopper that transmits the virus from plant to plant was very abundant in the lettuce fields, but no symptoms of aster yellows were observed on weeds in their vicinity, and the source of the infection carried by the insects therefore is not known. Aster yellows promises to be a limiting factor in the production of head lettuce in this region and probably will discourage the establishment of this otherwise very suitable industry.

Nematodes on Peanuts

THE root-knot nematode, *Heterodera marioni*, has not been a serious pest of peanut in Alabama, previously. Coyt Wilson of the Alabama Agricultural Experiment Station, however, reports that the race or strain that attacks peanuts readily has recently been observed in the State and appears to be on the increase. The first report was in 1946 when infected runner peanuts were sent to the Experiment Station from Coffee County in the southeastern part of the State. The peanuts came from a field in which the owner had been unable to grow peanuts for several years; the yield was less than 10 percent of that of neighboring fields.

In the summer of 1948 Spanish peanuts in one field in Houston County were severely infected with root-knot. All plants in the field were infected but the disease was most severe in a few localized spots. The grower stated that in 1946 no root-knot was observed on runner peanuts planted in this same field. In 1947 good crops of watermelons and cowpeas were harvested. In 1948 the symptoms of root-knot attack did not appear on the foliage until the plants

were almost mature. A field of runner peanuts adjacent to the Spanish peanuts and apparently on the same type of soil seemed to be free from root-knot.

In adjoining Geneva County root-knot was found in three different fields on runner peanuts. A portion of one of these fields was planted to runner peanuts in 1947; the other portion was planted to corn. There was practically no root-knot damage in the peanuts following corn, but where peanuts followed peanuts the

damage was severe, and it appeared that the yield would be reduced by about 75 percent. In another field where peanuts followed peanuts there were scattered spots where the plants were either dead or dying from root-knot; in this field most of the plants showed root-knot symptoms on the roots even when no symptoms were visible above ground. In the third field damage was slight; this field had been out of cultivation for five years and had been growing a voluntary crop of *crotalaria* each summer.

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Statement of the ownership, management, circulation, etc., required by the Acts of Congress of August 24, 1912, as amended by the acts of March 3, 1933 and July 2, 1946 of Agricultural Chemicals, published monthly at Baltimore, Md., for October 1, 1948.
 State of New York, County of New York.

Before me, a Notary Public in and for the State and County aforesaid, personally appeared Esfera Fay, who having been duly sworn according to law, deposes and says that she is the Circulation Manager of Agricultural Chemicals and that the following is, to the best of her knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933 and July 2, 1946 in section 537, Postal Laws and Regulations, printed on the reverse of this form to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are: Publisher, Industry Publications, Inc., 254 W. 31st St., N. Y. 1; Editor, Ira P. MacNair, 254 W. 31st St., N. Y. 1; Managing Editor, Lawrence A. Long.

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AGRICULTURAL CHEMICALS

Industry Patents

2,449,671. PYRETHRUM EXTRACT AND PROPELLANT SOLUTION CONTAINING IT. Patent issued September 21, 1948, to William W. Rhodes, Westtown, Pa., assignor to Kinetic Chemicals, Inc., Wilmington, Del. An extract consisting of a fluorinated solvent from the class consisting of CHClF_2 and C_2HClF_4 , the boiling point of which is -10.2°C . and the parts of pyrethrum flowers soluble therein.

A propellant solution substantially free from green coloring matter whose essential ingredients are a fluoro-chloro derivative of an aliphatic hydrocarbon of the group consisting of methane and ethane, gaseous at atmospheric temperature and pressure, only those parts of pyrethrum flowers soluble in a solvent of the group consisting of CHClF_2 and C_2HClF_4 , which has a boiling point of -10.2°C . and as a minor constituent sesame oil.

2,450,543. HERBICIDAL COMPOSITION. Patent issued October 5, 1948, to Albert L. Flenner, Wilmington, Del., assignor to E. I. duPont de Nemours & Co., Inc., Wilmington. A composition of matter, useful as a plant regulant herbicide, consisting predominantly of 5 to 25 parts by weight of 2,4-dichlorophenoxyacetic acid, 2 to 10 parts by weight of a dispersing agent, and the balance a mutual solvent for the 2,4-dichlorophenoxyacetic acid and the dispersing agent consisting of a mixture of cyclohexanone and hydrogenated naphtha.

2,451,085. INSECTICIDAL HALOIDO-ALKYLENE ESTERS OF CAPRYLPHENOXYACETIC ACID. Patent issued October 12, 1948, to Wm. F. Hester, Drexel Hill, and W. E. Craig, Philadelphia, Pa., assignors to Rohm & Haas Co., Philadelphia. Compounds of the formula

Capryl-Ph- $\text{H}_{2n}\text{OCH}_2\text{COOC}_n(\text{OC}_n\text{H}_{2n})_m\text{X}$ wherein Ph is a phenyl nucleus, X is a haloid from the group consisting of chlorine, bromine, iodine, thiocyno-

and cyano-groups, m is a number from zero to two, inclusive, and C_nH_{2n} is an alkylene chain of at least two carbon atoms in which n has a value of two to three, inclusive.

Trade Mark Applications

HINJ, in capital letters, for emulsifying, dispersing, solubilizing, and wetting agents. Filed Dec. 10, 1947, by Atlas Powder Co., Wilmington, Del. Claims use since Nov. 13, 1947.

SWEENEY'S, in capital letters in arc-shape, for rodenticide, for insecticide spray for plants; fly and mosquito repellent spray for farm stock; and disinfectant dips for farm stock and poultry. Filed Dec. 16, 1947, by W. R. Sweeney, Mfr., Salisbury, Md. Claims use since Jan. 1, 1892.

NU-BORDO, in italic capital letters, for insecticides and fungicides. Filed Dec. 23, 1947, by the Sherwin-Williams Co., Cleveland. Claims use since Aug. 2, 1933.

DENDROL, in stencil capital letters, for insecticides. Filed June 28, 1947, by Standard Oil Co., Whiting, Ind. Claims use since Dec. 13, 1926.

SELECTONE, in capital letters, for parasiticides—namely, insecticides, fungicides and herbicides and compounds which influence specific physiological processes in plants—namely, plant hormones. Filed Sept. 22, 1947, by California Spray-Chemical Corp., Richmond, Calif. Claims use since Aug. 1, 1947.

RUHM'S, in capital letters, for fertilizer. Filed July 5, 1947, by Ruhm Phosphate and Chemical Co., Mt. Pleasant, Tenn. Claims use since Jan. 1, 1931.

SIMPLLOT BLUE DIAMOND, with word "Simplot" superimposed over diamond, for complete fertilizers. Filed July 5, 1947, by John R. Sim-

plot, Pocatello, Idaho. Claims use since Aug. 14, 1945.

SIMPLLOT GREEN DIAMOND, same as above, for ammoniated phosphate. Filed July 5, 1947 by John R. Simplot, Pocatello, Idaho. Claims use since June 2, 1945.

SIMPLLOT RED DIAMOND, same as above, for superphosphate. Filed July 5, 1947, by John R. Simplot, Pocatello, Idaho. Claims use since Jan. 27, 1945.

TAKE HOLD, in stencil capital letters, for $\frac{1}{2}$ monopotassium phosphate and $\frac{1}{2}$ diammonium phosphate for a starter solution for transplanting vegetables and fruits. Filed July 12, 1947, by Victor Chemical Works, Chicago. Claims use since April, 1940.

SAFE N SURE, in capital letters, with extensions of the "N" under the word "safe" and over the word "sure", for plant food or fertilizer. Filed August 5, 1947, by Geo. Tait & Sons, Inc., Norfolk, Va. Claims use since 1930.

GAVIOTA-BRAND, in circle with motif of bird in center, for fertilizers. Filed Jan. 27, 1948, by Pacific Chemical & Fertilizer Co., Honolulu, Hawaii. Claims use since Jan. 1, 1912, on Gaviota; and since Jan. 1, 1920, on entire mark.

VELSICOL, in reverse capital letters with circle and large letter "V" in background, for hydrocarbon solvents preponderately composed of aromatic hydrocarbons. Filed Mar. 11, 1948 by Velsicol Corp., Chicago. Claims use since April, 1937.

SAFE-N-LEAD, in italic capital letters, for insecticides and fungicides. Filed Dec. 23, 1947, by Sherwin-Williams Co., Cleveland. Claims use since Feb. 19, 1940.

SPRED-RITE, in italic capital letters, for insecticides and fungicides. Filed Dec. 23, 1947 by Sherwin-Williams Co., Cleveland. Claims use since June 18, 1936.

CRYSTEX, in outline capital letters arranged in form of cross, the word running both horizontally and vertically with the letter "s" serving both, for sulphur. Filed Dec. 27, 1947, by Stauffer Chemical Co., San Francisco. Claims use since May 1, 1939.

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Salesman: Age 39, responsible, capable, well established, 20 years successful sales experience covering Pacific Northwest states, past 4 years insecticide sales to dealers, wholesalers, commercial and industrial accounts, desires lifetime sales connection with strong future possibilities with manufacturer of insecticides, herbicides, fungicides or basic materials. Address Box 297, care of Agricultural Chemicals.

Position Wanted: Helicopter Pilot with PhD in Economic Entomology desires research position in aerial application of insecticides and fungicides. Five years field and laboratory experience in testing insecticide and fungicide sprays and dusts. Available April, 1949. Address Box 301, care of Agricultural Chemicals.

ALVIN J. COX, Ph.D.

Chemical Engineer and Chemist

(Formerly Director of Science, Government of the Philippine Islands; Retired Chief, Bureau of Chemistry, State of California, Department of Agriculture.)

ADVISOR ON AGRICULTURAL CHEMICAL PROBLEMS AND INVESTIGATIONS

Consultant in reference to spray injury and damage, claims, including imports of fruits and nuts, formulas, labeling, advertising and compliance with law.

1118 Emerson Street
Palo Alto, California

CONSULTING ENTOMOLOGIST

Insecticides — Formulation
Plant Pathology — Research
Entomology — Legal Service

Eighteen Years consulting work.
Thirty years technical agriculture.

DR. E. R. de ONG

926 Stannage Ave., Albany 6, Calif.

Miscellaneous

For Sale: Fungicide carrier stable solution. Use your preferred fungicide with our carrier. Distributors wanted. Address Frank J. Zink Co., Dept. A6, 141 W. Jackson Blvd., Chicago 4, Illinois.

Slate To Puerto Rico

William L. Slate, Director Emeritus of the Connecticut Agricultural Experiment Station, New Haven, has accepted a post as consultant at the Agricultural Experiment Station at the University of Puerto Rico. He left on October 17 for Rio Piedras to take up his new duties which will include the preparation and writing of manuscripts and the establishment of an editorial department. He expects to spend a year there in an advisory capacity.

Mr. Slate retired last January as Director of the Connecticut station after holding the position for 24 years. He had been associated with agriculture in his state for 35 years.

AGRICULTURAL CHEMICALS

Wood AIF Committee Chm.

The AIF Association has announced that Henry J. Wood, Tobacco By-Products & Chemical Corp., Richmond, Va., has been appointed chairman of the Association's Membership and Information Committee. Mr. Wood succeeds Russell B. Stoddard, U. S. Industrial Chemicals Corp., who was recently elected a member of the board of directors.

H. T. Herrick Dies

Horace T. Herrick, 61, special assistant to the chief of the Bureau of Agricultural Commodities and Industrial Chemistry, died in Washington October 7. He had been connected with USDA chemical research for nearly 25 years, and was regarded as an authority on the industrial utilization of agricultural commodities.

Beg Pardon

In the publication of patent #2,444,905 issued to W. A. Sexton, Manchester, England, our September issue inadvertently misspelled the name of one of the ingredients. It should have read "2,4,5-trichlorophenylacetic acid." The magazine regrets the error.

Conservation Discussed

Monsanto Magazine, for October, 1948, carries an article by Dr. Paul B. Sears head of the biology dept., Oberlin College, Oberlin, Ohio, discussing the conservation of land in the U. S. He hails chemical controls of insects and disease as playing a major role in increased agricultural production per acre, and discusses the importance of chemical fertilizer materials in building up soil fertility. Not only is there a deficiency of NPK in many U. S. farmlands, but also a lack of minor elements such as zinc, boron, silicon and manganese, he points out.

Use of insecticides in halting infestations of tussock moth is described in the article, with statistics showing that an estimated one and a half billion board feet of merchantable timber was saved from damage or destruction which would otherwise have been done by the insects.

NOVEMBER, 1948

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(The Advertisers' Index has been carefully checked but no responsibility can be assumed for any omission.)



"... did he make dat four, Cuthbert?"

Cleaned...

MANY an advertising appropriation is spent,—cleaned out,—without doing much good saleswise. Often too much "fancy Dan" stuff, wrong publications or other media, too much "general" coverage. Advertising in specific industry publications does not fritter away your money,—goes direct to real buyers, effective concentrated circulation, low cost.

Accordingly, if you want your advertising message to go direct, specifically, and at low cost to the field of chemicals for agriculture, investigate the possibilities of

AGRICULTURAL CHEMICALS

254 WEST 31st STREET

NEW YORK 1

TALE ENDS

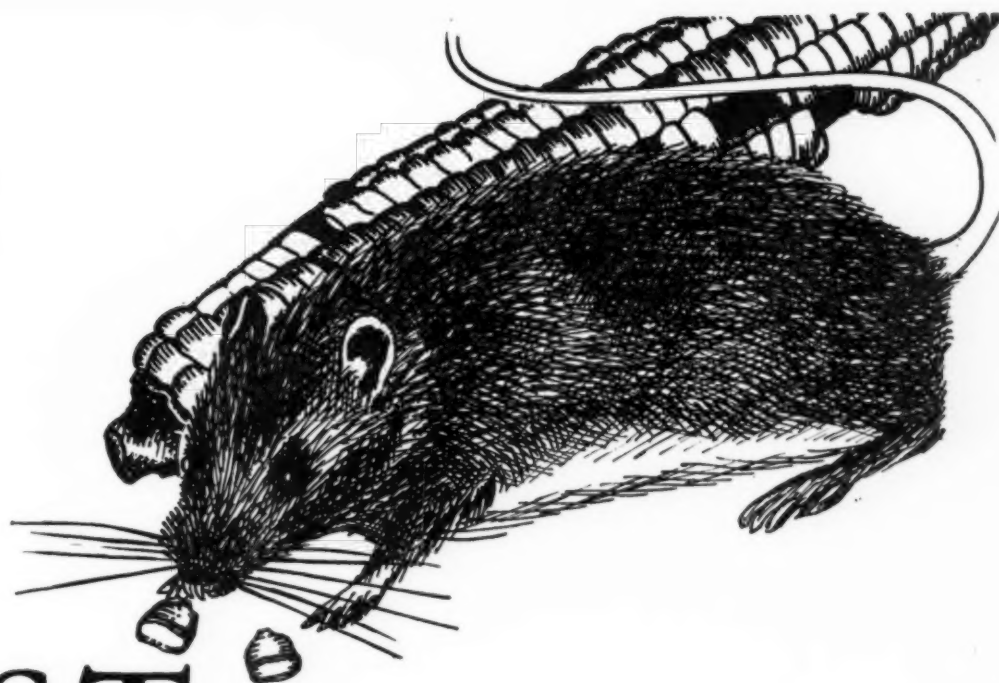
APART from other studies of 2,4-D on warm-blooded animals, the Pennsylvania Agricultural Experiment Station at State College has unintentionally carried on some experiments which weren't listed on the season's agenda. After applying 2,4-D to garden vegetables in herbicide experiments, it was found that dairy cattle and other livestock couldn't resist eating the treated plants. Also deer and various types of rodents were in on the nightly raiding parties which did so much damage that on some of the plots, yield records could not be compiled. Cows were reported to have left succulent pastures to eat treated fence rows, and rodents were found to have traveled a considerable distance to partake of the chemical delicacy. None of the raiding animals were known to have suffered any ill effects.

A bovine self-applying insecticide gadget was concocted recently on a Texas ranch by Albert C. Blevins, ranch owner, who got tired of watching his pet cow try to swish flies away with her tail. He glued on each flank of the cow, a pad saturated with insecticide, so that as the tail swished, it picked up a quantity of the toxicant which was in turn distributed over the entire area served by the tail. (Editor's note: spraying cattle is more successful, but probably not as much fun to watch.)

Stauffer Chemical Co. distributed its first issue of "The Tail Gate," a burlesque newspaper, at the California Fertilizer Association meeting at Riverside, last month. The paper, described in its masthead as "A helluva publication," combines robust humor with impressive facts about the company's new facilities at Stege, Calif. where 85,000 tons of superphosphate will be produced annually. A photo story of Stauffer's "Anchor Brand" is presented by its distributors, Wilson & Geo. Meyer & Co., Los Angeles. Other non-business pictures show some wild west barroom stuff.

AGRICULTURAL CHEMICALS

THE
RAT
•



PEST OF THE MONTH

... controlled with Fortified Red Squill

WITH the storage season coming on, rat control becomes of immediate importance.

The grains, foodstuffs and finished and packaged foods that are being warehoused now are needed for our own consumption and to feed the hungry peoples of Europe and Asia. The \$50,000,000 bill for rat-food is this year more than an economic waste, it can become a human tragedy.

Against this threat, Red Squill is a major weapon. It is the only material known to commerce that can be safely used for the control of rats in places where food-

stuffs are prepared or stored. It thus offers an attractive sales opportunity for the winter months.

Prentox Fortified Red Squill, in powder or liquid form, provides a uniformly lethal rodenticide concentrate. Formulated with suitable baits in a concentration of 10% by weight, it provides the required minimum lethal dose, and gives the slow-acting toxicity so that the animals in most cases die out-of-doors.

Further information on *Prentox Fortified Red Squill*, and its formulation into baits, is available on request.



R. J. PRENTISS & CO., Inc.

110 WILLIAM STREET, NEW YORK 7, N. Y.

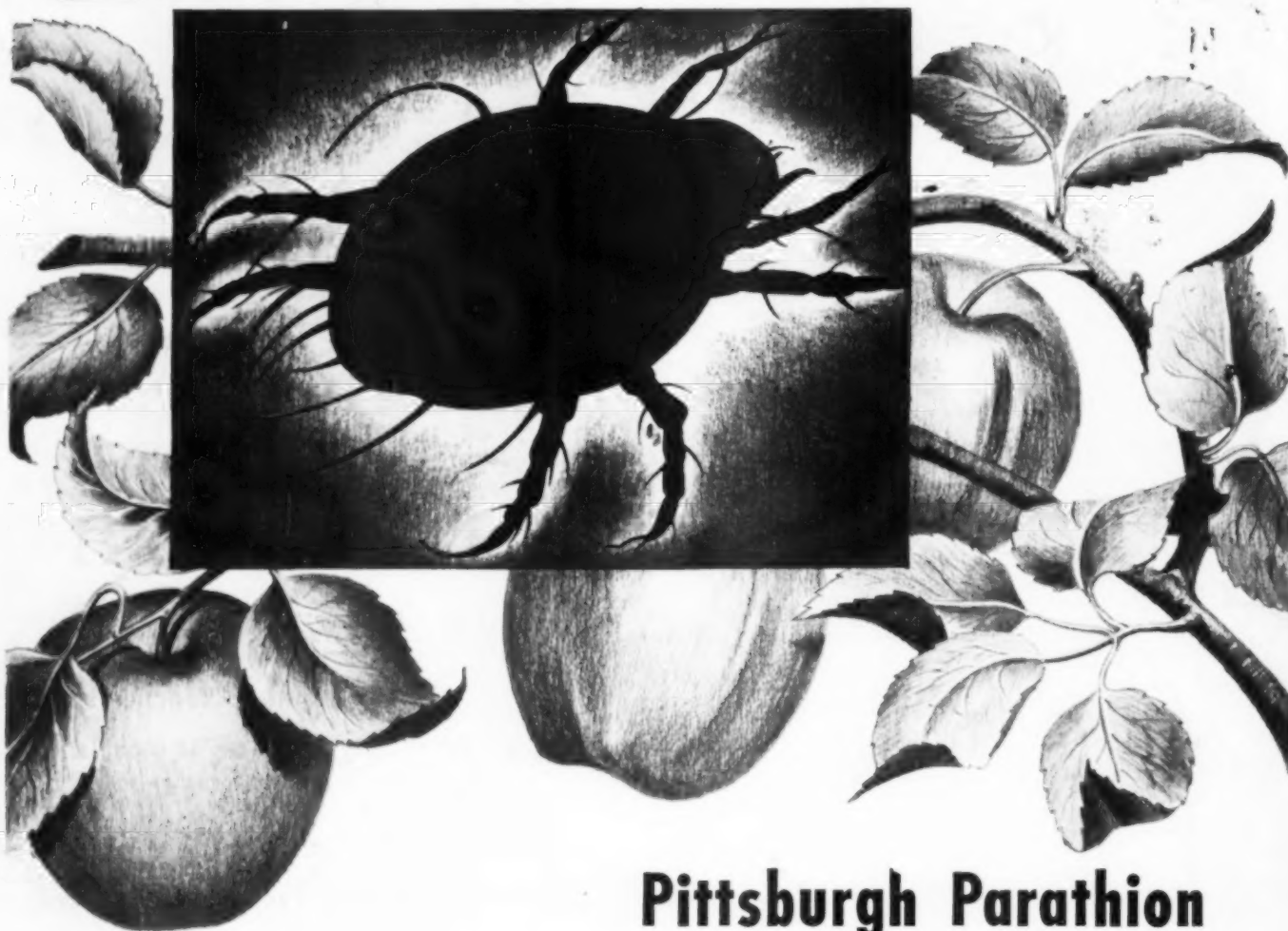
9 SO. CLINTON STREET, CHICAGO 6, ILL.

PRENTOX PEST-TESTED CONCENTRATES SOLD TO

INSECTICIDE MANUFACTURERS ONLY

DDT CONCENTRATES • SABADILLA DUST CONCENTRATE • PYRETHRUM PRODUCTS • CHLORDANE CONCENTRATES • CUBÉ POWDER

Barish this undesirable alien!



Pittsburgh Parathion

destroys the European Red Mite

Parathion is a new addition to the expanding *Pittsburgh* line of agricultural chemicals. With the development of *Pittsburgh* Parathion the company becomes one of the few basic producers of this acaricide. It is probably the most potent insecticidal chemical known to science.

Pittsburgh Parathion is produced in technical grade, 25% dust concentrate and 15% wettable dust concentrate, chemically and biologically standardized. It is available in bulk ready for mixing.

In addition to its effectiveness in controlling the European red mite and other arachnids, *Pittsburgh* Parathion is lethal to a wider range of insect enemies than any other compound now in general use. Full technical information is available in bulletin No. 106.

Your inquiries about this or any other *Pittsburgh* chemical are invited.

Other "Pittsburgh" Agricultural Products

2,4-D Acid—Amines—Esters

Sodium Thiocyanate

BHC (Benzene Hexachloride)

Technical and Formulation Concentrates

DDT (Dichloro Diphenyl Trichloro Ethane)

Technical and Formulation Concentrates

DNOC (Dinitro Ortho Cresol)

ANTU (Alpha Naphthyl Thiourea)

Chlordane Concentrates

HEPP TEPP PARATHION

(Organic Phosphate Insecticides)

Paradichlorobenzene

Orthodichlorobenzene

Phenol Disinfectants



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